THE JOURNAL OF

MEDICAL EDUCATION

OCTOBER 1953 • Vol. 28, No. 10

In Two Parts—Part 2

CIAL PUBLICATION OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

Preventive Medicine in Medical Schools

Report of Colorado Springs Conference, November 1952

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by

Katharine G. Clark

with Editorial Committee:

John P. Hubbard, M.D., Chairman

George P. Berry, M.D.

John H. Dingle, M.D.

Lloyd Florio, M.D.

Ray E. Trussell, M.D.

"Scientific medicine must become comprehensive medicine, yet not become thereby any less scientific."

—*George Packer Berry*

Published for the Conference of Professors of Preventive Medicine as Part 2 of the Journal of Medical Education, October 1953. Publication Office: Association of American Medical Colleges, 185 North Wabash Avenue, Chicago 1, Ill.

Printed by the Waverly Press, Baltimore, Maryland

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The Conference

A FIVE-DAY WORKING CONFERENCE was held in November 1952, to re-examine the teaching of preventive medicine in the light of the changing pattern of medical care and medical education today.

It was co-sponsored by the Conference of Professors of Preventive Medicine and the Association of American Medical Colleges, and made possible by generous support from the Rockefeller Foundation, the Commonwealth Fund, the National Foundation for Infantile Paralysis, the John and Mary R. Markle Foundation, the National Tuberculosis Association, the Metropolitan Life Insurance Company, the Albert and Mary Lasker Foundation, Inc., the Kellogg Foundation and the United States Public Health Service.

Seventy-six medical schools in the United States and Canada were represented at the conference; many contributed by providing travel expenses for members of their faculties. Membership included 70 professors and teachers of preventive medicine; 13 professors and teachers representing seven other fields of medical education; 29 consultants representing a variety of organizations such as schools of public health, foundations and voluntary and official health agencies; six consultants representing special fields such as nursing, social work and the social sciences. In addition, as an important part of the conference, 22 deans of medical schools attended as active participants.

All members took part in the deliberations of one of five committees discussing the central topics of the conference. These were:

Curriculum Content and Methodology—E. GURNEY CLARK, M.D., chairman.
Departmental Interrelationships—GLEN R. LEYMASTER, M.D., chairman.
Comprehensive Health Care—C. HOWE ELLER, M.D., chairman.
Community Health Activities—THOMAS D. DUBLIN, M.D., chairman.
Research—DAVID D. RUTSTEIN, M.D., chairman.

The conference was held immediately preceding the 63rd Annual Meeting of the Association of American Medical Colleges and at the same place, in order to secure maximum interchange of ideas between faculty and administration concerning the role of preventive medicine in medical schools. Many of our members stayed through the Association of American Medical Colleges meeting, where several sessions were devoted to considering the five focal subjects explored by our conference committees.

A conspicuous feature of this conference was the time and effort put into its preparation. A small planning committee functioned for more than a year in advance of the Colorado Springs meeting, determining policy, outlining the main topics for discussion, designating committee chairmen, and meeting with pre-

conference work committees. The preconference committees, in turn, supplied the groundwork for the conference discussions by preparing a wealth of carefully organized background material. Several weeks before the conference began, this material was sent to all participants. Many individuals, not all of whom attended the conference itself, added to its value through their work at this preparatory stage. The Division of Public Health Methods of the Public Health Service made a major contribution by compiling and annotating a comprehensive bibliography of preventive medicine content and teaching methods.

The president and the president-elect of the Association of American Medical Colleges took active parts in conference planning, and helped greatly in orienting this meeting to the long-range review of the whole program of medical education being undertaken through a series of teaching institutes sponsored by the Association.

Members of the planning committee of the conference were:

Lloyd Florio, M.D., chairman,
John H. Dingle, M.D., co-chairman
Ray E. Trussell, M.D., co-chairman
Duncan W. Clark, M.D.
John P. Hubbard, M.D.
Thomas A. LaSaine, M.D.
Hugh R. Leavell, M.D.
David D. Rutstein, M.D.
Ward Darley, M.D., co-chairman for the Association of American Medical Colleges
George P. Berry, M.D., coordinator with the Association of American Medical Colleges
Evelyn Rahm, executive secretary of the conference.

The Report

This report is based on information gathered by preconference committees, notes on conference discussions, reports of the five committees of the conference, and discussions and reports resulting from the Association of American Medical Colleges meeting. The attempt has been made to draw this material together so as to describe the philosophical tenets of preventive medicine and the scope of its activities, and to illustrate some of the ways in which its teaching may be conducted. While the report is not outlined according to the five topics constituting the agenda of the conference, all the points made in final committee statements are included.

Chapter I

The Expanding Opportunities and Responsibilities of the Physician

THE EDUCATION of doctors has varied enormously in response to the extent of knowledge and the conditions of society at any particular time. In the United States, whether in the apprenticeship period of the early 19th century, in the myriad isolated private schools of the following 50 years, or in the university and hospital-connected schools where scientific medicine has flourished during this century, the medical curriculum has been the ever-changing expression of an ever-changing educational ideal. Our conference tried to formulate the aims and methods of teaching preventive medicine in the light of what seems likely to be expected of physicians in the future, and thus in the light of evolving objectives of medical education today.

The story of western civilization's contest with disease dramatically illustrates the close interdependence of science and society. It is a familiar and continuing story: the wiping out of old-time plagues and pestilences making possible tremendous increases in urban living; the discovery and application of measures to master such scourges as typhoid fever and diphtheria bringing startling changes in man's life expectancy; the whole ascending spiral of a healthier population becoming a vastly more economically productive population, and by virtue of that fact, in turn, through better nutrition, housing, education, medical care and scientific research, attaining yet higher levels of healthfulness.

Fresh challenges constantly arise. New hazards to community, family and personal health appear as byproducts of our technological advances. As the menace of communicable and acute disease is lessened, the problem of chronic disease grows more formidable, creating changed demands on doctors, hospitals, families and community welfare services. As the population has an increasingly large proportion of older people, degenerative disease comes to the forefront. As mental illness increases, its victims now occupying half our hospitals beds, mental health, preventive psychiatry and social psychiatry receive new emphasis. As scientific knowledge grows, new opportunities arise for the individual physician as well as the public health official to prevent disease.

Of greatest importance has been the change in people's attitude towards sickness and health. A scant hundred years ago, the ravages of sickness were considered an inevitable instrument of fate. Today, most people in the United States regard an opportunity for health as they do an opportunity for education, a basic privilege of all citizens.

Paralleling the evolving concept of the worth of the individual has come a host of organized activities by both private and governmental agencies for the promotion of public health and welfare. It has been estimated that the nation's total expenditure for civilian health services increased 130 per cent in the past 20 years. As another example, the funds flowing into medical research have increased 10 times in the last 10 years in the United States.

New levels of achievement are reflected in mounting expenses in medical education and medical care, bringing about new methods of payment, such as voluntary insurance for hospital bills. The complexity of medical science brings mushrooming specialization, both within the profession of medicine itself and within and between the allied health services, resulting in an obscuring of the traditional general practitioner and demanding new methods and skills in integrating health services for the patient's benefit.

There is a growing awareness by medical schools of the need to re-examine their teaching, so as to provide a setting where students can better learn the habits of thinking and action which help them to become effective physicians in this changed scene. This growing awareness reflects a new way of looking at medical education itself, although it is of necessity slow in emerging. On this question Dr. Richard Shryock commented: "... it is still difficult for physicians today to conceive of care which transcends the traditional hospital type of diagnosis and cures. They were trained in the heyday of an almost exclusively somatic medicine based on a localized pathology and the related concept of disease specificity. Medicine of this type has achieved so much that some men quite naturally feel that it alone merits serious consideration. But in actuality, they are unable to view it critically because they are unfamiliar with any other type of medicine—that is, with the forms which preceded present medicine and which may, in part, supersede it in the future.

"The moment one examines historically the medicine which has been dominant in our own times, it becomes clear that this represents a late phase of medical development. Concepts now taken for granted hardly began to emerge before 1800, and did not command the thinking of most practitioners until about 1875. Prior to that time, most physicians were more concerned with the general condition of the patient in relation to his environment than they were with localized pathology or even specific forms of illness. They were interested in persons rather than in diseases and their medical education had implemented these outlooks through the apprenticeship, which had enabled them to see patients as persons in their normal surroundings."

When apprenticeship was superseded by the typical 19th century low-standard proprietary medical school, unconnected with a university or hospital, where instruction consisted almost wholly of didactic lectures, the student learned so little of real scientific value that the physician in practice still had to rely largely on observations of people and their responses to illness in order to provide what aid and comfort he could. The fact that today, in the popular mind,

the 19th century doctor is still the prototype of the "good physician" attests that even with such limited weapons he still was able to perform a useful service of some kind.

The flowering of scientific knowledge in the 19th century revolutionized medical education. American students coming home from study in Europe brought a new spirit and new methods of scientific inquiry, reflected in new standards in a few medical schools in Boston, New York, Philadelphia and in Baltimore, where the Johns Hopkins Medical School became a focal point in the process of creating a new kind of medical education. The medical course was increased to a four-year period, educational methods were introduced on a university level, and in place of sterile didacticism, students were given opportunities for self-education under supervision in laboratories and hospital wards. Furthermore, these developments made it possible to train the teachers of the next generation in the United States. This growing movement was translated into a sweeping reform of medical education under the impetus of the classic Flexner Report of 1910.

In accord with the then new conception, the task of the medical school was to train a physician fully equipped with all the means of a rapidly developing medical science in laboratory and clinic. The focus of this educational system was on the study of disease, its recognition in the laboratory and at the hospital bedside, and the application of therapeutic means for the cure of disease. A sharp distinction was drawn between curative and preventive medicine, the prevention of disease being regarded as pretty much limited to an administrative problem to be dealt with on a community-wide basis for the protection of the community as a whole.

Here in medical schools and teaching hospitals occurred the brilliant application of the scientific method which made possible the accumulation of the tremendous body of knowledge, both of etiology and treatment of disease, which is of course basic to medicine today.

Yet while training students in the complexities of hospital practice, and focusing on the detailed scientific handling of diagnostic and therapeutic problems, a price was paid in losing sight of the patient as an individual, as a member of a family and a community. That real values, intuitively appreciated by practitioners of a former day, had been abandoned, was slowly realized over the intervening years. Step-by-step evidence accumulated which indicated that the localized pathologic process must be understood in relation to the functioning of the entire body; that bodily function must in turn be understood in relation to the patient's personality; and finally, that the patient must be understood in relation to his total environment.

Health Goals Today

The goal of health now at mid-century calls for not only the cure or alleviation of disease. It calls for even more than the prevention of disease. Rather, it looks

beyond, to strive for maximum physical, mental and social efficiency for the individual, for his family and for the community.

To work towards this ideal, though, of course, never completely attainable end, requires the informed efforts of each individual person to improve his own health, requires provision of health resources by organized society, requires the skills and guidance of physicians and the assistance of various associated professional groups, and indeed of many other individuals, groups and agencies engaged in health activities in the community.

Coordinated health services must be directed toward providing a wide spectrum of comprehensive health care, promoting health, preventing disease, detecting and treating disease at the earliest possible moment to prevent disabling sequelae, limiting disability to the greatest extent possible if disease becomes established, and restoring the individual to his most useful practicable functioning when permanent disability is inevitable.

The Role of the Physician

Comprehensive health services require partnership between the physician and the community in which he serves, with mutual understanding of the interlocking responsibilities in this joint enterprise.

Society itself carries a large share of this responsibility, because so many social and economic activities bear directly or indirectly on health. Through individual and group action, people must strive to find a life that is conducive to health and happiness in terms of work, food, clothing, housing, recreation and social and family relationships. Also, in order to secure health services, they provide hospitals, health departments and the many other necessary health agencies and facilities; authorize the enforcement of minimum standards through licensure; support medical education and research; and, in the final analysis, through individual or group payment, foot the total bill for health services in whatever ways seem appropriate.

The physician offers a variety of services to the community beyond the care of individual patients. He cooperates with the health officer in maintaining health standards and assists in the planning and provision of health education and community welfare. By early reporting of communicable disease, births and deaths, he aids in the accumulation of data vital to community health. He is called upon to assist in professional education, to enlarge knowledge through research, and to support needed health legislation.

In relation to individual patients, beyond his traditional role of treating disease, advances in medical science and the changing character of health needs and resources give the physician today a much wider opportunity than in the past to assume leadership in the whole range of comprehensive health services.

At the turn of the century the practicing physician was predominantly concerned with the treatment of recognizable disease. He could do comparatively little as an individual for health maintenance or prevention of disease. Pure

water supplies and other basic sanitary accomplishments were being achieved through the concerted action of many different professional and lay groups. Today, besides these community measures, the well-being of individuals is also guarded and augmented by many personal measures provided by the physician or undertaken at his advice as, for example, prescription of a proper diet to avoid obesity, proper attention to health during pregnancy, health supervision of children and, to an increasing degree, periodic health inventory of the adult members of the family.

The physician's field of activity is therefore enlarged: to help the individual understand what he can do to improve his own health, when to look for medical guidance and how to follow it. At the other end of the spectrum, as the problems of chronic illness grow more pressing and community rehabilitation services expand, he has more opportunities to render restorative services.

There are only a few studies which show anything about the way a physician's practice is now distributed between preventive and curative activities. However, the large measure of preventive services given by pediatricians was indicated in a recent survey by the American Academy of Pediatrics, based on questionnaires returned by 81 per cent of all pediatricians and 65 per cent of all other practicing physicians in this country. It showed that 54 per cent of pediatricians' visits on an average day were for health supervision—thus less than half were for the care of sick children. Of the services given by general practitioners to children, approximately a third were for the supervision of their health.[1]

No comparable figures are available for adult patients. But a recent study, although based on the experience of only 41 internists, in one city, revealed that 26 per cent of their professional time was spent for preventive measures and an additional 19 per cent for health education—leaving only a little over half for the more traditional diagnostic and therapeutic services.[2] If a similar analysis of surgical practice were undertaken, it would undoubtedly also reveal a high proportion of preventive services. The surgeon today devotes much of his time and attention to examinations directed primarily towards the maintenance of health, and to a great variety of specific preventive measures, such as the removal of premalignant lesions.

Besides the services which he himself is equipped to render to the patient, the physician today has opportunities to marshall specialized help from many sources. In relation to the varied agencies and facilities the community provides, in relation to other physicians with special skills, and in relation to the more than 30 separate kinds of paramedical workers with training in fields such as physical therapy or clinical psychology, the physician acts as the individual patient's reassuring guide. Though he may assign responsibility for the management of an individual case to someone in a nonmedical field of health activity, such as to a rehabilitation worker when maximum physical restoration has been achieved, yet the physician still is primarily responsible for putting the patient into contact with the services he needs to secure comprehensive care.

The Changing Demands on Physicians

If the goal of health is maximum well-being for the individual, family and community, and if a principal means to achieve this is through comprehensive health services—in which many groups cooperate, but where the physician is key—what kind of physician is needed?

Naturally no complete answer is possible, but in discussing this question at the conference it was felt that there are certain basic attitudes, abilities and kinds of knowledge which should be common to all physicians if they are to be able to respond fully to this challenge.

Society today calls for a physician whose objectives will always be to conserve and improve health, to interpose barriers to malfunction and disease, and to extend the knowledge that makes these possible.

This physician must consider the variety of factors which bear on health, not just those of organic disease or impairment. Yet always he must maintain a realistic contact with the scientific basis of all that he does, realizing when he is acting on the basis of fact, when on the basis of informed theory and when he must act on the basis of speculation alone. He should see health and disease not as defined points, but as relative terms, realizing that either may be influenced by the degree of a person's adaptation to the complexities of his environment or by his innate potential for health. To grasp this view, he must appreciate the manifold variety of circumstances whose interplay determines whether man will resist disease or succumb to it.

Such a physician will be continually alert to the many-faceted causes of health and disease, and while using every available scientific means to measure or detect them, will also call on his trained observation of people and people's relation to their surroundings to add to the sum of what can be determined by the precision instruments of the laboratory.

Thus the physician must understand each patient as an individual, taking into account his ambitions, his feelings, why he behaves as he does. Similarly, it is necessary that the physician know how to evaluate the effects of a patient's way of living, his habits, his family, his job or other factors in his life as they bear on health. For example, a host of circumstances, from religious belief to weekly income, may work to negate even a simple diet order if the physician is unaware of how such circumstances affect an individual patient, and does not know how to deal with them.

A physician whose objective is truly to conserve health as well as to treat disease and who considers the effects of environment on health and disease, naturally thinks in terms of the community as well as of the individual patient. A physician who sees an anemic patient who has been handling benzol in a chemical plant would hardly be satisfied just to treat that patient, but would try to see what could be done about removing the hazard itself. If the existing standards in his state proved inadequate, he would help to improve them.

Finally, in his relation to the whole scope of comprehensive care, although any individual physician himself may be prepared to contribute only one highly particularized segment of the services his patient needs, yet it is his responsibility to see that many wheels mesh for this patient's benefit.

Not only must he know the wide range of facilities and resources which the community provides for the health and welfare of its citizens—from visiting nurse to job placement service—and know how and when to direct patients to them, but he must also be prepared to assume a pivotal position on a health team of many players. He must know how to work in intelligent cooperation with representatives of more than a score of specialties and subspecialties of medicine itself; and with a great variety of other people on this team, within the hospital and within the community—dentists, nurses, technicians, occupational therapists, dietitians, medical and psychiatric social workers and many others. He must be aware of the contribution that each can make to an improvement of individual and collective health in the community, and try to make the sum total of their contributions result in an integrated, rather than piecemeal, health service to his patients.

In brief, our conference believes that all physicians, in addition to requisite knowledge and ability to diagnose and treat disease, should have the broad goals of health always in mind; they should have a spirit of scientific inquiry, a broad understanding of the natural history of disease, a knowledge of people as well as disease, an insight into the relation of both people and disease to the environment, and the ability to call into play whatever services may be necessary to secure comprehensive health care.

Are Medical Schools Geared to Meet These Demands?

Many medical schools now do not succeed in offering the kind of educational experience necessary for preparing such physicians. If any one major defect were to be singled out, it would be that the students' medical education is too splintered. Often an insufficiently coordinated presentation of perhaps 32 distinct subjects, ranging from anatomy to clinical medicine, may leave the student with a fragmented view of health and disease. Clinical teaching situations may be too narrowly concentrated on somatic illness as seen in the hospital bed or outpatient department, leaving the student again with a fragmented view of both patient and disease.

The medical student, whose teachers are almost always specialists eminently expert in the diagnosis and treatment of some particular group of conditions, observes patients selected to demonstrate these conditions. He rarely has opportunities to observe any patient or group of patients over any continuous period of time or through varying medical and related needs and experiences. Although he may be reminded that he should consider "the patient in relation to his environment," "community resources for health," and "integration of preventive and rehabilitative measures into practice," these terms may remain

abstractions in any student's mind if the teaching situation itself fails to demonstrate their necessity and their practice.

An anecdote told at the conference epitomized this. A student seeing a patient once, at a particular acute stage of an illness in the highly artificial surroundings of a hospital ward, separated from all the circumstances of his usual life, even from his own clothes, was told by his instructor to "remember that the patient is a whole person." Could he truly appreciate the irony of the patient's worried question to a bystander after overhearing this admonition, "Was that doctor talking about *me*?"

Objectives in Medical Education Today

As medical education is evolving now, it seeks to recapture by new methods some of the values attributed to medicine of former days without sacrificing the values inherent in the prevailing tradition. This evolution stems from a growing awareness that "scientific medicine is medicine based on the fullest and most exact knowledge of man available," and that the term is "a misnomer when it is exclusively preoccupied with the physical and chemical constitution."[3]

Today many medical schools all over the United States are re-evaluating their curricula and are designing and conducting a variety of teaching experiments to give students a more comprehensive view of medicine. There seems to be a growing trend to cut across established departmental lines in order to provide a greater integration in teaching. At the same time, many schools are looking beyond the confines of the hospital to find new settings for teaching, just as 50 years ago teaching was emerging from the confines of the classroom to include clinical teaching in hospitals.

Our conference noted these experiments in medical education with keen interest, as most of them relate in some degree to methods of teaching preventive medicine.

However, the teaching programs that evolve as a result of the current interest in trial of new methods of course will be satisfactory only as they express and implement the over-all goals of medical education. During our conference we continually related our discussion of both the objectives and the methods of teaching preventive medicine to these goals, as formulated in the recent statement of the Association of American Medical Colleges, "The Objectives of Undergraduate Medical Education."[4] As this statement will be referred to throughout this report, it is quoted here in full:

> Undergraduate medical education must provide a solid foundation for the future physician's development. It should not aim at presenting the complete, detailed, systematic body of knowledge concerning each and every medical and related discipline. Rather, it must provide the setting in which the student can learn fundamental principles applicable to the whole body of medical knowledge, establish habits of reasoned and critical judgment of evidence and experience, and develop an ability to use these principles and judgments wisely in solving problems of health and disease.
>
> Undergraduate medical education cannot achieve these aims if the student is relegated to a passive role. It must provide incentive for active learning on the part of the student. This

can best be done by giving him definite responsibility in real, day-to-day problems of health and disease. This responsibility must, of course, be carefully graded to the student's ability and experience and must be exercised under careful guidance by the faculty.

Given incentive to learn and guidance toward the grasp of principles, with the problems of health and disease as a frame of reference, the student will build the necessary foundation for his career in medicine, be it practice (general or limited), teaching, research or administration.

In working toward this fundamental objective, undergraduate medical schools must strive to help the student to: acquire basic professional knowledge; establish essential habits; attain clinical and social skills necessary to the best utilization of that knowledge; and develop those basic intellectual attitudes and ethical or moral principles which are essential if he is to gain and maintain the confidence and trust of those whom he treats, the respect of those with whom he works and the support of the community in which he lives.

These five aims are obviously not distinctly separable, but are mutually interdependent. All together, they summarize the desirable characteristics of the responsible professional person medical education is attempting to produce.

Taking these five aims as a basis for specification, the more detailed objectives of undergraduate medical education are:

A. *To help the student acquire requisite knowledge:*

1. Of the normal development, structure and function of the human being.
2. Of the common disorders of development, structure or function.
3. Of the manner in which physical, chemical and biological agents as well as hereditary factors, psychological factors, living habits and social forces affect the human being favorably or unfavorably.
4. Of the availability of a wide variety of diagnostic, operative and other therapeutic procedures in the hands of specialists.
5. Of the general techniques and resources available both to the individual and to the community for the prevention of disease and the maintenance of health.
6. Of the social and cultural settings in which medical education and practice are carried on.

B. *To help the student establish essential habits:*

1. Of continuing self-education, through critical reading and evaluation of information, and through use of the scientific method in approaching medical problems.
2. Of thoroughness and accuracy in carrying out diagnostic and therapeutic procedures.
3. Of consideration and perceptiveness in the handling of patients.

C. *To help the student achieve basic skills:*

1. In eliciting an accurate and adequate history.
2. In making physical examination and utilizing effectively such instruments as are commonly used by all physicians.
3. In performing and interpreting essential laboratory tests and in requesting and interpreting special studies conducted by technicians or by specialists.
4. In using assembled data to provide a valid diagnostic appraisal and an effective course of action, calling upon additional specialists' services and community services as needed.
5. In interpreting findings and diagnosis to patients in such a way as to give hope and understanding and to avoid undue apprehension and pessimism.
6. In winning and holding the confidence of patients and their families.
7. In working in the medical team of physicians, nurses, social workers, physical therapists and others.
8. In working in the community team of official and voluntary institutions and agencies providing health services.

D. *To help the student develop sound attitudes:*

1. Of viewing individuals in their entirety as complex human beings in a complex and changing environment.
2. Of seeking ways to promote and to maintain patients' health, understanding that it is more effective to prevent disease than to cure it.
3. Of approaching each ill patient as a person with disordered development, structure and function, the cause and cure of which are problems to be solved by means of careful scientific investigation.
4. Of basing the plan for cure, rehabilitation or adjustment to permanent handicap upon the joint efforts of the medical team and patient to assist nature's healing powers.
5. Of expecting to be a student all his life and to learn and to revise old thinking as long as he continues to practice medicine.
6. Of accepting the fact that the physician can cure sometimes, relieve often, prevent frequently, comfort always.

E. *To help the student gain an understanding of professional and ethical principles:*

1. Of being willing to accept the responsibility for the initiation and continuing coordination of all of the efforts directed toward the patient's problem or problems as they relate to his health.
2. Of establishing definite diagnosis and treatment only after adequate study.
3. Of supplementing one's own judgment, as occasion requires, with the wisdom and counsel of competent medical specialists.
4. Of charging fees in proportion to the time, skill and special facilities required and with due regard for the patient's economic circumstances.
5. Of being mindful of his obligations to the community as a physician, with reference to the community's problems of health and disease, and equally as a citizen.
6. Of respecting the rights and dignity of patients and the reputation of one's colleagues.
7. Of extending freely his professional aid in any emergency.

The objectives of undergraduate medical education do NOT include:

1. Attempting to provide the *detailed* systematic knowledge of anatomy, biochemistry, physiology, microbiology, pathology or pharmacology required of graduate students majoring in one of these fields.
2. Attempting to provide a detailed presentation of *all* the disorders that affect the human being.
3. Attempting to provide a detailed presentation of all the physical, chemical, and biological agents, hereditary factors, psychological factors, living habits and social forces that may affect the human being favorably or unfavorably.
4. Attempting to teach the techniques required for the successful practice of the various specialties."

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Chapter II

Contributions of Preventive Medicine in Medical Education and Research

UNTIL FAIRLY RECENTLY, teaching preventive medicine meant teaching about public health. This was an expression of the traditional separation of responsibility for health services between the practicing physician and community organizations, as typified by the public health department. As noted in the previous chapter, 50 years ago the doctor's job was almost solely to treat the individual patient's disease; the job of public health was almost solely to prevent communicable disease in the community by controlling certain aspects of the environment.

Although these original responsibilities of course remain, it is apparent that present-day knowledge and techniques for maintaining health make such a clear-cut separation of function no longer valid. Moving from these divergent poles, medical practice and public health for some time have been converging into a common orbit in the provision of a wide range of preventive measures; practicing physicians through direct preventive services to patients, public health—whether voluntary or official—through organizing the provision of many such services to individuals where a particular disease or condition is so widespread that it is regarded as a community problem.

Measures for the early detection of diabetes provide a good example. A conscientious physician may routinely test the blood and urine of all the patients in his practice and find a certain number with previously unsuspected diabetes. Yet many people having this condition still asymptomatically never happen to get to the doctor's office at all, until later, when it is all too apparent that they are sick. Since there are significant numbers of such people in the population, public health organizations, voluntary and official, may do their part in finding them through arrangements for mass screening. Under the auspices of the private physician or under the auspices of a community program, the service to the patient is the same—an important measure of preventive medicine.

Similarly, of course, prenatal care is preventive medicine, whether the physician giving this care sees the prospective mother in his own office, in a hospital clinic, or in a clinic operated by a public health department.

Thus, today, the term preventive medicine has a broad meaning, including public health as only one special part of its general concern with all other aspects of health maintenance. This is a relatively new way of looking at the field.

A review of the names of our corresponding medical school departments in the

past suggests this change in orientation: departments of "medical police" were in vogue in the 1830's; later the names considered appropriate evolved through "hygiene," "sanitary science," "public health and preventive medicine," to the current term "preventive medicine."* And already there are signs that this name, too, will yield to another. Our conference indicated some dissatisfaction with the term "preventive medicine," but did not find an acceptable substitute. Note was taken of departments under the heading of "community health" and "environmental medicine." Some members liked the English and Canadian name for their corresponding departments, "social medicine." The word "social" in this connotation relates both to the individual, as "socius," or fellow, and to "societas," the larger group.

These changes in name reflect a new clinical orientation in the teaching of preventive medicine and its relation to the community. While a clinical approach as well as a community approach may not be possible or suitable to other parts of the world, it does reflect the particular level of health goals and services in the United States at this time.

Our conference concludes that the teaching of preventive medicine to undergraduate medical students should focus mainly on the principles and practices of protecting health which are directly applicable to physicians caring for individual patients. Our special place in medical education is the incorporation of preventive medicine in clinical practice. Since personal health is inseparably linked with community health, however, the practice of preventive medicine requires a basic understanding of the individual in relation to the group. It requires more—a willingness to cooperate with organized community effort.

The science and art of advancing health and preventing disease is as broad as medicine itself. It does not deal with any particular group of biological disorders, nor does it concentrate its interest on a particular area or function of the human body, nor any particular classification of people by age or sex. The body of knowledge and skills of measurement and application that it has accumulated gain broader value in proportion to the extent to which they are used in other fields of medicine. Likewise, it is dependent on many other fields of medicine for advancement of knowledge and application of preventive measures. By virtue of these facts, the teaching of preventive medicine should be regarded as a cooperative enterprise within the medical school, for, like psychiatry, it functions best when spreading horizontally through a school curriculum.

Because this is true, our conference questioned whether a department of preventive medicine, as such, was necessary. We concluded that a separate department is now desirable in an educational system which is organized along highly specialized lines, lest what should be everybody's business becomes in fact nobody's. This aspect of our discussion will be recorded more fully later in this

* Since the names of departments responsible for teaching preventive medicine still vary considerably, for purposes of our conference we used the title "department of preventive medicine" to apply generally.

report. However, it should be clear at the outset that when we describe the attitudes, knowledge and skills which a student should acquire to become a physician effective in the preventive aspects of medicine, we do not believe that this teaching must be limited to our department, any more than all aspects of child health, for example, must be limited to the department of pediatrics.

I. The Viewpoint of Preventive Medicine

Our conference was asked by the co-chairman and representative of the Association of American Medical Colleges, Dr. Ward Darley, to formulate answers to a number of general questions. The first of these was:

> What concepts, values and areas of interest from the field of preventive medicine should be common to all physicians?,—

By the time a medical student finishes his undergraduate training he should have formulated at least some of his ideas about the purposes of medicine in general, and about his opportunities to implement what he has learned, both in relation to individual patients and to the community in which he will practice. Preventive medicine can contribute to a student's formulation of these ideas by helping to introduce him to the idea of human ecology. In proportion to its success in teaching this interaction of the human organism with the environment, preventive medicine shares in the development of some of the qualities needed for physicians today, as described in the previous chapter.

Thus, in all his necessary concentration on detail throughout medical school, the student should never be allowed to lose sight of the big picture: that man exists in and as part of a most complex world, and that forces within this world, playing on each other as they touch on him, are in a ceaseless state of flux and change; that man himself is also in a ceaseless state of change; that health and disease are never fixed absolutes, but only terms which describe the relative balance between man and his total environment at any given moment—health as the extent to which he masters the sum of his inner and external stresses, disease as the extent to which he is their victim.

Throughout man's natural history he is constantly subjected to hazards and stresses which threaten his health. To meet these stresses he is endowed with a natural resiliency which varies greatly during his span of years throughout the processes of his growth, maturation and withering. This resiliency varies, too, according to his particular genetic endowment, psychological constitution and many other factors.

If preventive medicine's challenge is to protect man from the hazards to his health, students must study man, in all his complexity, both in order to measure and to best fortify his resistance. They also must be prepared to recognize the varied kinds of hazards and stresses which impinge on man's health: disease agents; factors in man's hereditary constitution and in his personality; and cir-

cumstances in his physical and in his social environment, all of which—in combination or singly—may strain the individual's resistance beyond the limits of tolerance and bring disease or malfunction.

If the success of prevention depends first upon the knowledge of causes, it depends next on the opportunity to use this knowledge to help man successfully counteract the stresses he encounters. The student should come to have a view of the natural history of disease, so that as a physician he may continually seek opportunities to interrupt its course most promptly for his patient's benefit. He should be aware that before the pathologic process is recognizable, the causes may be operating in man himself or in his physical, biological or social environment. He should understand the evolution of disease, from the first factors which lead to its initiation through changes in man's form and function leading to eventual defect, disability or death. In short, the central core of preventive medicine is an appreciation of the natural history of man and the natural history of disease.

With such a view, the student should come to see that in any individual, from the period of his apparent health through the course of any disease or disorder, the physician has opportunities to "come before" the event.* In some instances, depending on existing knowledge and opportunity, complete prevention is possible; in others, only intervention is possible, to prevent development of further disorders. But preventive opportunities of some degree or other are never lost until the patient himself is lost.

A student can most easily visualize his opportunities to practice preventive medicine if he sees these opportunities in relation to the whole scope of comprehensive health care, as outlined in Chapter I. We believe that the student can look at the entire range of health services in terms of what have been called "levels of prevention." At these various levels, measures may be applied to the agent, the host, or the environment at some stage or another of the natural history of disease.

The Levels of Prevention: Measures for *health promotion*, whether in the form of improved housing for a particular group of people or in the form of advice given to an individual mother in the care of her newborn child, are measures to fortify health, rather than to combat any particular disease or disorder.

On the other hand, *specific protection* represents prevention in its strictest sense. Here measures are taken against a particular disease or group of diseases, to intercept their causes before they involve man. Some of these measures may be applied to the environment, such as when a shield is put over the moving parts of a machine in a factory, or a sewage disposal plant installed in a town. Others may be applied directly to man himself, such as by immunization procedures.

Early recognition and prompt treatment are the best preventive measures for

* To prevent, in modern usage, means to stop. The Elizabethan connotation of the word, to "come before," expresses more exactly the purposes of preventive medicine as we see it.

disease where there is yet no known specific protection, as in cancer. They are also needed when for one reason or another specific preventive measures were not applied, as in dental caries.

Similarly, when there is failure of prevention at an earlier phase in the natural history of the disease, preventive measures may still be applied to *limit disability*. Here, treatment of the disease process, even when it is firmly established, may still prevent its continued course and avert defect or disability and postpone death.

Rehabilitation is the final weapon. Although disease has to a greater or lesser extent handicapped the individual, after it has become relatively stabilized there are still opportunities to make good use of remaining capacities. Even though changes in form and function are no longer reversible, measures may still be taken both to help the individual and to modify his environment so that he can often return as a useful member of society.

A student who gets the impact of this point of view will be the kind of physician who continually asks himself not only "What is wrong with this patient and how can I help him?", but also "Could his disease have been prevented?"

Although this approach to medicine, we feel, is fundamental to the development of a physician oriented towards fortifying health and preventing disease, it is clear that it cannot be instilled in students exclusively by teachers in any one field. The experience of learning is an integrated process—even more so in the development of attitudes than in the acquisition of knowledge. How can proof be offered and claims made that preventive medicine, or any other discipline, is responsible for the inculcation of specific attitudes? We make no such claim, but believe rather that our teaching can contribute to realization of the previously quoted objectives of medical education, in helping the student develop sound attitudes: "of viewing individuals in their entirety as complex human beings in a complex and changing environment," and "of seeking ways to promote and maintain patients' health, understanding that it is more effective to prevent disease than to cure it."

II. Knowledge and Skills of Preventive Medicine

The second general question posed to our conference was:

> What knowledge, skills, methods and techniques should all physicians be competent to apply in order to be effective in the field of preventive medicine?

As we deal in this section with the major elements of instruction in preventive medicine, it should be noted that the departmental responsibility for teaching these matters may vary from one medical school to another, but that acquisition of such knowledge and skills by students is fundamental to their becoming physicians equipped to practice medicine in all its components, including prevention. It is also fundamental for the conduct of research in preventive medicine.

Epidemiology

As the term is used here, epidemiology is the study of all factors and their interrelationships which affect the occurrence and course of health and disease in a population. These factors include the characteristics of the host population; the causative agencies—predisposing, precipitating and perpetuating; and the biological, physical and social environment. The objective is to discover the causes of the disease process and to determine the points in its natural history where interruptions may be accomplished in man's favor.

Epidemiology, of course, is much more than the "study of epidemics." It has been repeatedly demonstrated that the principles of epidemiology, although applied originally to years of study of communicable disease, also may be applied to the study of a great variety of other disorders, conditions and situations. A few examples of discoveries about noncommunicable conditions made through the use of epidemiological methods are the role of iodine in the prevention of goiter, of fluorides in the prevention of dental caries and of vitamins in the prevention of specific nutritional diseases.

The word epidemiology has overlapping usages. In one sense it is the body of knowledge amassed to describe the incidence and prevalence of a disease in time, place and group. This is *descriptive* epidemiology. In another sense, epidemiology is a *method*, an orderly scientific approach to the collection and analysis of data that have to do with disease causation and behavior. Such multiple usage can be compared with the meanings of the word pathology, denoting both the description of morbid changes, and the science of the study of these changes.

Students need to understand both the epidemiological approach and the kind of knowledge required to determine the epidemiology of a particular disorder. The first comprises the basic principles of epidemiology. The second encompasses the methods used to ferret out the multiple causes of disease. To prevent or modify a disease, information such as the following is required:

Disease agent factors: biologic, nutrient, physical, chemical, mechanical or psychologic conditions which contribute to disease occurrence.

The characteristics of man in this connection: his personality, habits, and customs; inherent characteristics of age, race, sex, etc.; and defense mechanisms.

The character of the environment: its social, economic, biologic and physical aspects.

Epidemiology in all of its ramifications obviously relates widely to many areas of medical school teaching, both in the basic sciences and in clinical fields. Ways in which this and other aspects of preventive medicine can be taught will be considered in succeeding chapters.

Biostatistics

Biostatistics is a special skill that has been highly developed and extensively used in preventive medicine. It is a fundamental technique in epidemiological

study as it provides methods for analyzing facts about variations in the health status of individuals and groups in time and space, and for measuring the intensity of association among the factors contributing to such variations. Through the study of biostatistics, moreover, medical students gain a critical attitude toward all scientific data, procedures and observations. They learn the concept of correct design of experiment and methods of collecting and analyzing data, and they learn to use a tool designed to focus attention on biologic variability.

There is an apparent trend to separate the two phases of biostatics into vital statistics and biometry. Vital statistics is concerned with population size, components and changes, trends in morbidity, mortality and natality rates relating to the health and welfare of the community. Its teaching enables students to understand the value of accurate information about these matters and, incidentally, demonstrates to them why it is important that practicing physicians report such information promptly and correctly to the health department.

Biometry, fundamental to the scientific method itself, has to do with observation and judgment of all evidence. It introduces the student to a body of knowledge concerning the concept of variability, range of normal values, appraisal of scientific data, design of experiments, methods of presenting data.

The statistical method is taught most often in departments of preventive medicine, because of the long-established close relationship of vital statistics and community health. As statistical techniques are being more widely used throughout many medical school departments, however, these techniques are being taught with increasing frequency in a number of departments besides that of preventive medicine.

Study of Health

During his first two years of medical school, in the classroom and laboratory, the student is taught systematically the precise anatomical, physiological and biochemical knowledge painstakingly accumulated over the last four centuries to describe and measure the "normals" of bodily structure and function. Less frequently is he asked to study systematically the "normals" of living people as distinguished from those of the cell. Yet such understanding is basic to activities for promoting health.

The specific factual knowledge which a physician can use to encourage health is limited compared with knowledge about preventing illness or curing it, although it is rapidly increasing.

Reliable yardsticks for measuring physical and emotional growth and development are fairly well developed for the early years of life and the school years. Although there are no standards believed to be as reliable for the adolescent years, there is available information for particular groups in the adult population.

The armed services, for example, have brought together a great deal of information for their own purposes. There, for very practical reasons, research techniques are evolving in order to define the norm, to determine who may be fit to undergo

the extreme stresses necessary in military life. Efforts that have been directed towards proper selection of men physiologically and psychologically equipped for aviation and submarine warfare have yielded valuable information. Occupational medicine also has learned a good deal about precise measurements of fitness.

It is important that students learn what is now known regarding what is "normal," but it is also important that they realize that there are wide areas in which knowledge is conspicuously lacking. The scientific approach to health promotion and maintenance is possible only with a more exact understanding of what constitutes health, and with a better understanding of the nature of the adaptive devices which enable man to maintain health.

Knowledge of Environmental Aspects of Medicine

Environment was broadly defined as the aggregate of all external conditions and influences affecting the life and development of an organism, human behavior and society. Together with those factors arising in man himself, they initiate all disease.

Thus, it is imperative that medicine look to the environment in order to realize the full measure of health maintenance and protection. First, if preventive medicine is to be effective, its practitioners must consider how to reach the individual to protect his health before sickness strikes. Second, its practitioners are compelled to bring their influence to bear upon disease-producing situations as well as upon the sick person.

As Dr. David Barr said in a paper given at the meeting of the Association of American Medical Colleges immediately following our conference, "One of the prime essentials of preventive medicine is continuity of care. Access to the physician should be unobstructed and not dependent upon the accident of illness."[1] Yet traditionally the physician's job starts when the patient comes to him, when health is broken down and when illness has intervened, saying, "Make me well!"

To change this pattern requires efforts by many different groups. That it can be done to a great extent through the leadership of physicians has been shown in relation to the care of children. Parents are trained to seek preventive medicine in this field. In order to do their share as physicians, students must learn the kinds of habits, attitudes and economic factors which influence an individual's decision to seek medical care, and the kind of arrangements conducive to providing preventive care.

Knowledge of pertinent environmental factors is obviously just as essential in prescribing treatment of disease as it is for its prevention or diagnosis, since from the world in which the individual lives come certain influences which may aggravate and perpetuate a disorder, and others which may be purposefully used to alleviate or correct it.

Preventive medicine thus must give students basic information and, more importantly, excite their curiosity about the kinds of things which may af-

fect people's health. Students should learn to consider both the effects of conditions in the physical environment such as housing or working surroundings, and conditions in the social environment such as the effect of family relationships, ethnic, religious and educational influences. The nature and effects of arrangements for providing and paying for medical care and trends in medical practice should also be understood.

By the same token, preventive medicine requires that students know the community and its resources as they relate directly and indirectly to health. This includes understanding of the role of governmental and nongovernmental health agencies, social and welfare agencies and legal resources. Through study of such resources and experiences with using them, it tries to give the student an appreciation of his future role as a physician in relation to comprehensive health services. It also gives him basic skills in working with other professional people who provide services related to health, helping him prepare for his pivotal role on the health team.

Specific Preventive Measures

Almost all the clinical departments of the medical school teach specific ways to practice preventive medicine. Obstetrics, for example, alive to the necessity of continually watching over the health of the mother during pregnancy to prevent conditions which might lead to difficult or abnormal deliveries, stresses in its teaching such matters as control of weight and diet, and methods for early detection of toxemia.

Although the teaching of specific preventive measures is by no means limited to a department of preventive medicine, should emphasis on these measures be inadequate in particular areas of clinical teaching in a certain school, a department of preventive medicine has a real opportunity to stimulate increased activity in these areas. Certainly it must, through its own teaching and by close working relationships with the clinical departments, alert students to look for ways to apply the principles and practices of preventive medicine in the widest variety of situations for individual patients.

Students should acquire some basic knowledge of the kinds of measures that are employed to protect the health of the community, such as occupational medicine, the functions of health departments and of health agencies. Although the administrative and technical skills of public health, as such, are material for graduate rather than undergraduate study, just as the student learns the scope of the other specialities of medicine, he should learn, too, what the specialty of public health embraces, what resources exist, and how these may be useful in the practice of medicine.

In general, students should come to appreciate that . . . "Our best clinicians in these days are our most active practitioners of preventive medicine in their day-to-day clinical work. . . . Our best local public health departments today

are as much concerned with planning comprehensive medical care for the citizens of their community as with carrying out their traditional six-point public health program of prevention."[2]

Comprehensive Care

One cannot "teach" comprehensive health care any more than one can "teach" medical ethics. All a student's experiences in a medical school contribute different facets to it. Yet a comprehensive understanding of health services and the physician's role in relation to them requires educational programs designed to help the student acquaint himself with the functioning of many types of health services.

As a carefully planned part of instruction, therefore, we believe that students should have some experience in programs which provide continuous care of the patient in all the various circumstances of sickness and health and which offer opportunities to demonstrate a more comprehensive view of health services than is usually possible within the walls of a hospital. Although leadership in planning and developing such programs has come from various departments in different medical schools, preventive medicine has usually been among those in the forefront and has a particular contribution to make because of its knowledge of the resources of the community which might be used for teaching purposes.

III. Research in Preventive Medicine

Vigorous research activity stimulates both teaching and learning—in the teacher it encourages a fundamental inquisitiveness which spreads from the research laboratory to his teaching, planting the seeds of this inquisitiveness in the student.

Preventive medicine is so broad that, depending on the particular interests and abilities of individual members of departments, research may be conducted in a wide variety of fields and involve a wide variety of disciplines. This is reflected in the range of current research programs, which include epidemiological studies, therapeutic trials of drugs, research programs in parasitology, mycology, toxicology, industrial medicine, statistics, administrative research and many other types of studies.*

Preventive medicine can make a particular contribution to the total research program of a medical school through the disciplines of epidemiology and biostatistics, which are usually not extensively represented in other departments. At the present time the department of preventive medicine is most likely to exercise leadership in introducing and encouraging the use of these disciplines.

Epidemiological studies, which explore the distribution and course of health and disease in whole population units, comprising sick and well people, may yield significant information which can be applied in planning for the maintenance of health and the prevention and treatment of disease. Such studies also may pro-

* See Appendix C.

vide important correlations leading to experiments designed to determine etiology, natural history and procedures for prevention and treatment.

The investigations of Goldberger and Sydenstricker on pellagra classically illustrate the scope of the epidemiological approach to a noninfectious disease. They defined precisely the disease entity to be studied; they surveyed the total population of the selected community before the season of occurrence of the disease, and periodically resurveyed the total population in order to establish the incidence of pellagra; they examined in detail the kinds of food purchased by the population as well as the sanitary conditions of the communities. Thus, use of the epidemiological approach in a well-conceived study with appropriate biostatistical methods made it possible to postulate a definite hypothesis to be tested in the laboratory.[3]

A more recent illustration of epidemiological research that may be cited here is the recent work of Rammelkamp and his colleagues[4,5] on glomerulonephritis. Consideration of the inconsistencies of the epidemiological behavior of acute hemorrhagic nephritis and rheumatic fever in a variety of population groups led to a re-examination of their relation to group A streptococcal infections. The probable explanation seems to lie in the observation that only certain strains or types of group A streptococci are capable of inducing the nonsuppurative complication of acute hemorrhagic nephritis, whereas infection with many types of group A streptococci may be followed by rheumatic fever. These studies, supported by clinical and laboratory data, appear to indicate that the acute and chronic nephritides may in fact be distinct diseases and require different approaches for their prevention and control.

The essentiality of biostatistics in epidemiological studies is illustrated in the studies just described. It is equally essential in studies which seek to test the effects of therapy or other medical and health procedures on individuals and groups. In such studies, illustrated by the well known investigations in England and in this country of the effects of streptomycin on tuberculosis, penicillin on syphilis, and fluoridation on dental caries, it is through the application of statistical principles that experiments with appropriate controls have been designed.

Collaborative Studies with Other Departments and Agencies

Effective research programs may be conducted cooperatively by departments of preventive medicine with other medical school and university departments, and with outside voluntary and official health agencies. The initial impetus for collaborative studies has originated in various departments. For example, carefully controlled studies of sick people conducted by a department of medicine have raised questions which could be answered only through a collaborative project where both well and sick persons are studied by epidemiological and statistical methods. On the other hand, epidemiological studies have raised questions which could be answered only with the help of clinical or preclinical departments.

Fields of Research

Our Committee on Research discussed in some detail the fields of research especially appropriate to preventive medicine, and felt that all of the areas suggested for study, a few examples of which will be illustrated below, could be grouped in the following four categories:

1. Determination of health needs—for example the study of techniques leading ultimately to the availability of adequate morbidity data, which today are lacking.
2. Examination of the factors associated with or responsible for health needs—such as studies in the natural history of disease.
3. Application of knowledge and determination of the effects of this application on the community and the individual.
4. Communication, or study of methods of transmitting scientific knowledge about health and disease to health personnel and to the public, and inspiring appropriate individual and community action.

Epidemiological Studies of the Natural History of Chronic Disease—Studies of this kind relate to examination of the factors associated with or responsible for some of our most critical health needs today.

Many chronic diseases involve not only the hereditary and chemical characteristics of the individual, but also his modes of life. Studies of the predisease factors in the environment therefore may yield useful results. For example: "In cancer it is a challenging fact that this condition occurs much more frequently in certain groups of the population than in others. Cancer of the stomach affects men much more commonly than it does women; it strikes unskilled workers twice as commonly as persons in professional or managerial positions. Cancer of the lung occurs four times as frequently among men as among women; it occurs at a very high rate among persons exposed to certain chromate ore operations or radioactive ores. Cancer of the cervix in women affects low-income groups to a much greater extent than upper-income groups.

"All these facts, and many more, suggest that cancer is associated with a variety of social conditions. Avenues which could be systematically explored by epidemiological methods are: occupational and other factors in the physical environment; lifelong habits such as diet, smoking, hygienic practices; other illnesses and accidents far removed in time, etc. . . . These and similar factors should be studied to determine their relationship to cancer of various organs.

"Identification of these factors cannot be made in a test tube or under the microscope; they must first be studied in whole population units, sick and well, and all the gradients in between, where observations of the people exposed to certain conditions can be carried on over a long period of time. The knowledge gathered in this way then serves as the basis of further research to be pursued in the physiological, biochemical and pathological laboratory, thus bringing us closer to the final conquest of cancer."[8]

The same kinds of research, focusing on different aspects of man in relation to his environment, can be directed towards scientifically isolating factors, or combinations of factors, which relate to many other problems, such as disorders of the heart and mental health.

Research of this kind, of course, requires the collaboration of specialists in many different fields of science and social science, working with a wide assortment of tools, studying the defined problem from many angles and over long periods of time.

Our research committee drew up a detailed outline of the nature and possibilities of control of a disease of multiple causation, using rheumatic fever as an illustration (Appendix D). This shows the possible research approaches to the etiology of the disease; identification of cumulative events leading to recognizable disease; course of the disease after recognition, and study of effects of preventive and therapeutic measures. It shows clearly both the range of problems to be studied in one such disease and the variety of special disciplines and work areas required to attack them.

Health as a Field for Research—As was noted previously, there is great need for more knowledge of the processes of human growth, development and adaptability at all stages of man's natural history, in physical, mental, emotional and social aspects, to establish base lines, and to define "health" more accurately.

One of our members stated: "All life may be compared to a hurdle race, if you like—consisting of periods of stresses and periods of relatively easy going. In the first three or four months of life there is considerable stress for a new mother and her child. And that happens again about the age of a year, and again when the child goes to school, and again during adolescence, during premarital years, during pregnancy, and during menopause, and then during old age.

"We do have an increasing body of knowledge in this area which does allow prediction of some of the problems that are coming in here, something in the way of anticipation, and something in the way of guidance when these problems come up —but extension of our knowledge in this area is a most extraordinarily important field of research."

To give one example: "Age and the diseases which often appear in aging people are not the same thing or a single complex. Age must be studied as an independent variable if the roles of time and continued risk and exposure are to be understood in either a purely scientific or a purely practical sense. Research programs are needed, directed to studies of the fundamental processes of aging itself. Questions that pose themselves range from the dynamics of cell structure to the problems of adaptability under different psycho-social circumstances."[8]

Again, as in the example above, collaborative research effort is needed, the biologist, the sociologist and the epidemiologist and many other specialists attacking particular aspects of the problem in a concerted manner.

Administrative Research in Medical Care—There are many questions regarding the application of knowledge and the effects of this application on the community and the individual which require answers. For example, if arrangements for securing medical care are considered valuable in proportion to the degree that they encourage easy access to preventive services, including early diagnosis and prompt treatment of high quality, what methods of financing best achieve these ends? Although there is a good deal of controversy about this subject, surprisingly little exact information is available on which to base conclusions. Many studies could be made to elucidate this question: for example, the extent to which utilization of physicians' services by a group of people paying on a fee-for-service basis differs from utilization by a comparable group who are protected by insurance, and if there is a measurable effect on types of service according to whether doctors are reimbursed by individual fees or through per capita or salary arrangements.

Likewise, there is need for developing reliable means of evaluating the qualitative as well as the quantitative effects of community health programs, such as in medical care for recipients of public assistance, school health services, occupational health services, rehabilitation programs and similar activities.

Laboratory Resources for Preventive Medicine

As has been indicated above, research as well as teaching in preventive medicine often requires the cooperative efforts of many departments within the medical school and university. Its relation to the basic sciences is obvious; cooperation from the clinical departments is essential because a clear knowledge of nosology and diagnosis of disease is basic to the epidemiological approach.

Similarly, research in preventive medicine may employ any or all of the kinds of laboratories used in allied disciplines. As has been illustrated, however, the laboratory of the community itself is necessary for certain kinds of studies in preventive medicine, just as it is necessary for certain kinds of teaching in this field.

The community laboratory makes possible the study of a whole population and of selected groups within it; e.g., family, industry, university health service. Here studies can be made in human growth and development; epidemiological investigations concerning the way disease is acquired; clinical and laboratory work on vaccines and antisera, and drugs for prevention and treatment; engineering studies for general methods of prevention or control; studies of administrative methods; health education; economic analysis of the costs of preventive or therapeutic measures, and statistical evaluation of the incidence and prevalence of disease.

Consulting Service to Other Departments and Agencies

A major contribution of preventive medicine to the research programs of other departments of the medical school, the university and other agencies, is consultation service by representatives trained in the particular disciplines of our field, biostatistics and epidemiology. Particularly in the case of biostatistics, de-

partments of preventive medicine can aid other departments in the design and planning of laboratory and clinical experiments, with particular reference to the selection and size of random samples necessary to attain significant results; they can contribute technical assistance and methods for analysis of data, and interpretation of the significance of experimental results. Biostatistical consultation to the hospital record department, for example, may serve to further programs of clinical investigation of all departments and has served as the basis for installation of special long-range follow-up registries which contribute to longitudinal study of disease. The extension of biostatistical methods to clinical studies is a desirable current development, and this trend would be strengthened by the active participation of a biostatistician at the level of primary collection of medical data in the hospital record department. This would help to assure precise diagnostic terminology suitable for research purposes.

The department also can provide technical training in biostatistics and epidemiology for members of other departments, and following their period of training can give them continued technical assistance.

It can also make available to other departments information from studies in progress and from the literature of preventive medicine. These services awaken an interest among members of other departments in the epidemiological and biostatistical implications of their research, making for better working relationships and for more significant studies.

IV. Summary

The special characteristics of the field of preventive medicine were summarized by one member of the conference as follows: "Preventive medicine is interested in well and sick populations and is not geared just to a disease or to the sick; it needs a community laboratory; it is concerned with the person in relation to the group of which he is a member, the mass approach as well as the individual case approach; it must use methods and disciplines broader than medicine itself, the social sciences; biostatistics is an essential tool." Thus preventive medicine, by whatever departments it is taught, deals with health, and with disease at all stages of its natural history, with professional services, and with the relationships implied as these concern society—the whole community, population groups whose health is at an exceptional risk, the family, and the individual person.

The broad goals of teaching in preventive medicine throughout the medical school are to equip the student with the kinds of knowledge required to avert disease, as well as to treat it, and to develop in the student both the philosophy and the habits which will lead him to search out opportunities to bar the course of disease at continually earlier points in its natural history.

To achieve these goals, the student must learn to understand the reactions and adaptations of man to his physical, biological and social environment. Health, as well as disease, must be a frame of reference in his teaching. The health and disease phenomena of groups, including epidemiology and the quantitative meth-

ods applicable to medical science, should be an important part of his instruction. He should learn to appreciate the pertinence of these phenomena both to research and to the care of individual patients.

Besides the specific knowledge and skills needed to fortify health and to prevent disease, the student should acquire a working familiarity with the varied professional and community services used in the provision of comprehensive health care to the individual and family. Finally, he should become aware of the opportunities of physicians for leadership in community health, being encouraged to live by the principle that his profession requires acceptance of responsibility to the patient and to the community of which he is a part.

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Chapter III

The Student

THE CONTRIBUTIONS that preventive medicine should make to the education of medical students have been briefly described. What kinds of teaching are effective for making these contributions? This chapter begins to prepare the ground for some answers to this question by looking at medical education in terms of the student's response: it broadly outlines various kinds of teaching situations which seem either to discourage or to help the student in his preparation for the practice of medicine in general and the practice of preventive medicine in particular. This general discussion prefaces the more detailed exposition and description of various specific ways to integrate preventive medicine into the curriculum which will be found in succeeding chapters.

Since many of the problems of teaching preventive medicine are the same or similar to those involved in teaching any subject, much of our discussion necessarily relates to broad aspects of medical education itself. In tackling questions which have plagued and will continue to plague medical educators for generations, we tried simply to put into focus the thinking of one group of faculty members, realizing that there are, and can be, no definitive answers to the questions that present themselves.

College Preparation

Ideally, a student's educational experience during the entire period from college entrance through internship should be examined as a continuous whole. Although such an undertaking was obviously beyond the scope of our conference, the collegiate phase of the medical student's education was briefly discussed.

College students preparing for a future of work with people must have a knowledge of people, both as biological and social organisms. Thus, as is becoming increasingly recognized, along with courses in science and mathematics, education in the humanities and in the social and behavioral sciences is extremely valuable.

Although no attempt was made to specify the particular subjects that should be prerequisite to medical education, it is clear that college courses in the physical sciences should give the student not only factual information but should emphasize the methods of approach to problems in science; courses in mathematics should lead toward his understanding of quantitative methodology; courses in psychology should lay the groundwork for his appreciation of human behavior in the individual, and its variability; courses in the humanities should sharpen his appreciation of man as a creative, reasoning and emotional being; courses in history,

sociology and economics should give him an understanding of man's relation to society and the institutions society has evolved. Of perhaps greater importance, the student's college experience should help him develop qualities of intellectual independence and initiative in self-education, qualities which the medical school should encourage in every possible way.

Special Situation of the Medical Student

Most students are attracted to medicine by a desire to work for and with people. They believe that their medical training will give them the ability to do so. Some students, of course, have other motivations, such as interest in research or teaching, or even position in the community and economic security. Nevertheless, it is probably true that a large proportion of entering students come imbued with a spirit of innate humanism. How to nurture this spirit, which is essential to physicians who will emphasize prevention in their practice of medicine, is a central problem facing medical schools.

Many factors in the student's environment work against this orientation at the present time, so that not infrequently by the fourth year a student, rebuffed and confused, has lowered his sights. Without laboring the point, we suggest a few of the problems the student faces during his medical school career, particularly as they affect his receptivity to the attitudes of preventive medicine.

Even more than most graduate students, the medical student faces a prolonged period of economic dependency. Usually he continues to receive financial support from his parents at an age when his college friends are already self-supporting, married and with families of their own. Often, though his work is extremely demanding, he must get an outside job in order to stay in school.

Some consider that a student's way of life in medical school is extremely isolated, creating other problems. Putting this in sharp relief, one member stated: "The medical student retires from society to an institution, becomes stratified in his interests and limited in his contacts. Even the opportunity to associate with students of other classes is almost nonexistent. His instructors are physicians or specialists allied to the field of medicine and the focus of interest is narrow. Though the medical school is part of a university, frequently it is divorced from university life even when physically situated on the same campus."

Although these circumstances in his way of living demand considerable adaptability if the student is to keep his perspective, the study of medicine itself brings impacts which call for even more adaptability. Many of these, of course, vary with the individual student's past experience and make-up; others are shared by most students.

Almost universally the student is affected by the experience of dissection or attendance at the autopsy table. Another shock hits him when he begins to realize the mass of material to be learned, particularly in the basic science fields. Often he becomes bewildered and frustrated. Again, at some time during his clinical years, the discovery and appreciation of what responsibility for a patient's care really

means often comes as a frightening realization to an imaginative student. A student who is emotionally unable to accept such responsibility is likely to cling to the constricted though respectable position that his job as a physician will be just to diagnose and treat disease, not necessarily to care for the individual patient in any larger sense.

Although psychiatrists in quite a number of schools are beginning, through formal programs, to help the student understand and deal with the various emotional stresses he undergoes during his training, more generally the student is still more or less left to sink or swim, achieving maturity—or adjusting to immaturity—as best he may.

I. Difficulties in the Teaching Environment

The way in which the subject matter of medicine is presented plays a dominant part in determining a student's attitudes, as well as his ability to learn.

Attention to Details Rather than Principles

Several members of the conference deplored the amount of teaching time demanded by circumscribed departments for imparting to students masses of detailed information relating to their particular fields. There was some feeling that a good deal of such study of detail might be more appropriate to postmedical school training. As one dean put it, "There is at present a frittering away of a lot of time teaching a medical student how to be a specialist in some area or other. . . ."

Teaching along narrowly departmentalized lines often makes it difficult for the student to synthesize the tremendous volume of information he receives—to make knowledge out of facts. For example, it is quite possible for a student to learn many separate demonstrable scientific truths arrived at originally from the use of biometric methods, and to study these methods themselves, yet for him not to achieve real understanding of their basic importance to scientific endeavor or ability to apply these methods in the collection and analysis of new data.

This opinion has been expressed as follows: "Most of the present laboratory programs at best develop only one or two aspects of scientific method; namely, observation and technique. Often they consist merely of cookbook attempts of the students to reproduce the results given in the book. The student may be led into the rather anti-scientific attitude of disregarding his own observations if they do not agree with the authority's."[1]

Examinations, too, frequently test only the amount of information that a student is able to retain in a particular field rather than his growth in ability to acquire knowledge and to organize and use it.

Compartmented Approach

If teaching in the basic sciences is sometimes narrowly oriented, so too, sometimes, is clinical teaching. Some clinicians, though possessing extensive knowl-

edge, are often limited in their view of the patient's problems. As teachers they are apt to "build walls around what they know." One member illustrated this by a typical story of ward rounds. "A patient with heart failure is seen. There is talk about particular murmurs and their significance, the degree of failure the patient has, the relative merits of salt and fluid restriction, rest, diuretics, morphine, and it's left at that point. Nothing is said about the patient's family, who is taking care of her children at home, or what kind of work she is going to be able to do—or if she can't work, who is going to take care of her. . . . She is considered just a heart, or a salt restriction. . . ."

A fourth-year student was quoted as saying, "We came here social minded, we leave lesion minded."

The idea of the "whole patient" must seem odd to the medical student at the beginning of his training: it would not occur to him to think of a patient in any other way. Later, after the fractionation of the body and the specialization of medical knowledge has had its effect over a period of years, the student finds this concept odd for a totally different reason. By then it is difficult for him to recapture the wholeness of a patient.

Conflicts in the student's mind often arise when opposing opinions are given by his teachers in the form of final authoritative judgments. One member recalled: "How often did I hear an instructor lay down the law, and warn us that his statement would subsequently be contradicted. Later indeed another instructor did deny it, or give an equally definite varying judgment. At first our reaction was, 'Why can't you people get together?' Not for some time did we realize that perhaps neither knew the answer, because the answer had not yet been found." Clearly, in medicine as in any other field, the teacher who sometimes says "I don't know," and indicates avenues for exploration, provides a greater stimulus than the self-styled authority.

Inadequate Contacts with Patients

If it is true that most students are attracted to medicine out of an interest in people, the fact that they often see no patients during the first two years of their training cannot but be frustrating. Early emphasis on the cadaver, the postmortem room and the laboratory may give the student a frame of reference to the lifeless rather than to the living which he later carries into the outpatient department and to the bedside, where he may relate problems to the morphological rather than to the functional.

Furthermore, when the student finally does come in contact with patients, it is often to observe not sick people, but "disease as presented in the living host." The patient has been selected to demonstrate a particular disease at a particular stage of its development. The student gets not only little appreciation of the slow beginnings or the long-term effects of a specific illness, but also little appreciation of the patient in relation to his total life. As another member remarked: "In very broad terms, we have almost deprived our students of a perspective of time, be-

cause in order to run our teaching we have taken acute cases in hospitals up to the point of unequivocal diagnosis and then washed our hands of them."

Similarly, of course, the patients a student sees are limited to those that choose to come to the hospital with a presenting complaint, usually a pressing one. He has few opportunities to observe the first levels of prevention being practiced, and often has few opportunities to gain insight into the complicated problems involved in rehabilitation.

If he himself lives and works in institutionalized surroundings, the patients he sees only in these same surroundings are apt to become in his mind an integral part of the scenery. It is difficult for him to visualize them in relation to their own real world and to be perceptive of the effects of this world on their health.

II. Removing Barriers to Learning

What can be done to overcome some of these factors in the student's environment that present obstacles to learning preventive medicine? Although recognizing their importance, the conference did not discuss the kinds of administrative measures that might help the student have a more secure and less confined life, nor how psychiatric guidance can help him handle his personal emotional reactions to medicine. However, we did touch briefly on the general philosophy of medical education and discussed in some detail educational situations which seem to provide good opportunities for the student to learn what we seek to teach. Admittedly, high caliber students and stimulating instructors will result in a good product, however the teaching is conducted. But good teaching programs are important to create a situation in which each student can strive to the extent of his ability, and in which he wants to strive. Such programs elevate the level of all the students, not just the top 10 per cent.

Considering the problem of medical education most broadly, it was felt that too often we talk in terms of instruction, rather than in terms of learning. Teaching was once defined as "what the professor does to the student" and learning as "what the student does to himself." Since it is obvious that total coverage of the field of medicine during the four-year period of undergraduate education is impossible today, it is important that the medical student learn basic scientific principles and methods of attacking problems. He has to develop independence in planning, in thinking and in evaluation of facts. He must then accept major responsibility for his own education. This is how the candidate for the Ph.D. degree works in a graduate school. In general this is not now true in medical schools, though we think it should be. The guiding principle then becomes an attempt to create conditions for the student favorable to scholarship in which individuality can flourish.

It is also important that each student keep before him the over-all design of his medical education—why he is learning what he is learning. If he understands early and at each point along the way what are his long-range as well as his short-range objectives, he will have an incentive to acquire the knowledge necessary

for a professional education rather than just the incentive to pass examinations. For this to be possible, of course, the curriculum must be carefully coordinated and teaching goals kept clearly in mind by each member of the faculty.

Appreciation and use of the scientific method is a major long-range objective to which a student can constantly try to relate his studies and experience, and to measure his growth throughout his four years of medical school. The student needs to grow to a thorough understanding of the principles of reasoned and critical judgment, and to acquire such established habits of applying these principles to the examination of evidence that he will continually approach the facts he encounters, be they biological, sociological or emotional, as links of knowledge to be fitted together in an objective manner susceptible of review. If he develops real respect for the scientific method, when dealing in fields where the use of these methods is relatively new, such as in some of the social sciences or psychiatry, he will neither discount the importance of the fields nor discount the importance of the method, but be challenged to extend the application of the method into new areas. To make this clear to students is particularly important in our case, since preventive medicine must work increasingly closely with many new disciplines.

Likewise, the medical student needs a continually growing appreciation of the physician's role in the wide spectrum of health needs and services as another basic frame of reference for his medical education.

Many teaching methods and situations are appropriate for learning preventive medicine: lectures, seminars, laboratory exercises, participation in clinics, ward rounds, and in activities of community health agencies. Teaching programs in our field, some of which will be illustrated in Chapters IV and V, vary considerably in detail. Many of them are still on trial. For these reasons, their broad purposes and values to students are described here in general terms.

Practice in Biometric Techniques

To help the student gain real familiarity with the principles and application of the scientific method, exercises involving active use of biometric methods were considered to be very important. These exercises may take a variety of forms, and may be conducted at different points in the student's education. Where a program can be developed which allows the student to design his own finite experiment and follow it through to its conclusion, he probably derives the maximum benefit, but he should find out how to apply biometric techniques to a variety of both basic science and clinical problems.

Programs Demonstrating Coordinated Care of Patients

An increasing number of medical schools are experimenting in the development of programs designed to give students an experience in the coordinated health care of patients or families. Several schools, for example, have established *general clinics* within the regular hospital outpatient department which, though differing considerably in detail, have been organized to let the student see patients in a

unified way rather than by fragmentation among specialties and in detached single episodes. Students see the same patient or patients over a continuous period of several weeks or months in the clinic, and may follow these patients into the hospital wards and back to their homes.

Teaching programs which take the student into the community help him learn to seek factors in the environment which are important as they affect health, and help to demonstrate the meaning of preventive care. By home visits to a child who has had polio, for example, the student may find that a shiftless father, or overanxious and critical grandparents are presenting this child with special problems which, unless mitigated, may result in his psychological crippling as well as obstructing maximum recovery from his physical crippling. Such factors in the child's health might never be apparent during a clinic visit.

Through contact with the community the medical student may also gain an understanding of public policy, community needs and the role of the various agencies and disciplines required for an effective level of health service. Such experiences also give him opportunities to learn the skills of a teamwork approach.

There are various kinds of *extramural* activities, including home care, family follow-up, family health advisor and preceptorship programs. Students may also observe and take part in the work of community agencies.* Such programs are, we think, extremely useful in the training of physicians; at the same time we believe that it is essential that extramural experiences like these add perspective to basic knowledge of health and disease and neither represent a separate body of information nor emerge as an overwhelming service obligation.

We talked of the community as a teaching laboratory as we talked of it as a laboratory for research. The use of this term is intended to suggest that the scientific discipline and spirit of objectivity that characterize preclinical and clinical teaching should be extended by the university to the study of community phenomena in their natural setting. For the medical student the community becomes a teaching laboratory in the best sense of the word if the phenomena chosen for his study involve his personal exercise of observation, hypothesis, testing, validation and judgment.

The teaching principles which so far have proved satisfactory in extramural programs were listed as follows:

1. The student should have an active role, assuming a responsibility commensurate to his capabilities.
2. He should have the opportunity to participate as a member of a team.
3. Wherever possible, teaching should center around a problem.

* In 1951, out of 64 schools answering a questionnaire on extramural teaching practices, 29 reported the regular required practice of students visiting the homes of patients and their families, with 9 others preparing to follow suit. In still other schools, students may elect this activity. Only 19 schools reported that there was no visiting to the homes of patients. (Minutes of Proceedings of the Sixty-Second Annual Meeting of the Association of American Medical Colleges, October 1951. "Report of the Committee on Environmental Medicine," D. W. Clark, chairman, *J. Med. Educ.*, Vol. 27, No. 3, Part II, May 1952.)

4. The experience must involve the student for an adequate period of time, and must provide continuity of observation and contact with patients.

5. Each patient's needs should be viewed as a single problem: where several teaching departments are concerned with his welfare, their efforts must be closely integrated; where several social agencies are concerned, the student must likewise appreciate the need for coordination.

6. Extramural experience should be introduced as early as possible in the curriculum.

7. The student must be adequately prepared for the teaching situation. However, his curiosity should not be satiated by too much detail in preparation. He should have scope to discover certain facts for himself.

8. Review and discussion of the student's experience is essential. It must be related to the individual student, both to guide in interpretation of his findings, to relieve his anxieties, and to help him measure up to his responsibilities.

Although these principles were formulated to apply to teaching in extramural programs, many of them, of course, apply equally to other aspects of the teaching of preventive medicine. Some of these principles, however, raise important questions. For example, contact with patients has long been recognized as essential for instruction during the last two years of medical school. Here, however, it is suggested that students deal with patients during the years traditionally reserved for classroom and laboratory instruction in the basic sciences. When this early contact with patients is made, how should a student participate? Passive observation may be an unrewarding experience. If he has no responsibility for rendering medical care, as he obviously cannot, what role can be devised for him that patients will accept and where he will have actual responsibility of another sort?

Again, where student participation is called for, adequate preparation is clearly essential. But how much, and what kind of preparation for an extramural experience constitutes "adequacy"? Similarly, how can supervision and guidance best be accomplished in such programs?

One of the principles most frequently stressed was that the student have a long enough experience with a particular patient to broaden his understanding of people and to come to see all of the patient's problems as they relate to his health. Although it was emphasized that in these programs the student does not need a large volume of case material, but rather needs a few cases carefully worked up and followed over a prolonged period of time, how can such a long-term experience be secured within the present crowded curriculum?

The use of these newer teaching situations, of course, raises many such new problems. How they are met in a number of different medical schools at the present time will be seen later in this report. Without exception, they demand thoughtful and careful advance planning. Yet we consider that when a program for demonstrating aspects of comprehensive care is well designed, its benefits to students far outweigh the difficulties. Where good extramural teaching is part of his medical

school training, for example, we believe the student may derive the following advantages:

1. He prepares for his later practice by taking part in the care and follow-up of all phases of a patient's medical needs—whether in a hospital, at home or in a clinic.

2. He comes to consider preventive measures as an integral part of medical practice, because he learns to take part in the maintenance of health through advice and education of the family, specific immunization procedures and health examinations.

3. He sees illness early, and how it strikes.

4. He learns to appreciate how interpersonal relations bear on illness, and learns to deal with the everyday emotional problems of the patient.

5. He sees the patient as a member of a family and neighborhood, not as an isolated specimen.

6. He appreciates the significance of the environmental milieu in illness: housing, crowding, sanitation, income, habits and customs.

7. He takes part in an active medical team including both physicians and other professional people.

8. He learns the availability and use of community health and welfare agencies in the provision of medical care such as visiting nurse associations, school speech classes, family aid societies, vocational rehabilitation, etc.

9. He observes the character and significance of the burden of disease in the community—the incidence of acute respiratory disease, mental and chronic illness, not simply the acute illnesses seen in hospitals.

Through all these experiences he comes to appreciate the practice of medicine as a social responsibility.

An Appreciation of Medical History

A view of medicine in its historical setting also helps the student to gain a fuller awareness of the role of the physician in society. We do not mean that the student should study the history of medicine in an antiquarian and biographical sense, but that he should understand the evolution of his profession both in terms of the reciprocal relations of medical science to the other sciences, and of the background of socio-economic forces which have placed the health professions in the position they now occupy. By understanding how present concepts have evolved, the student will be more apt to envisage his relation as a physician to the society in which he lives. Furthermore, appreciation of the evolution of medicine in the past prepares the student to expect change in the future.

A considerable number of schools now offer courses in general medical history. These can be adjusted to the present purpose if they include social and professional as well as technical content. The historical perspective is an important part of the presentation of most subjects in the medical curriculum; it should be

introduced at some point in the teachings of the department of preventive medicine, either in general introductory discussions or at the beginning of certain courses.

Cooperative Instruction

An increasing number of medical schools are encouraging arrangements whereby instructors representing different departments cooperate in teaching subjects which ramify into their special fields.

Since the principles and practices of preventive medicine apply so widely to many areas of medicine, our teaching lends itself particularly well to such arrangements. As preventive medicine relies on knowledge both of the normal human being and of the etiology of disease, it relates closely to study in the basic sciences; as it relies on application of preventive measures throughout the five *levels of prevention*—namely, health promotion, specific protection against disease, early diagnosis and treatment, disability limitation and rehabilitation—it relates to clinical observation and experience; as it relies on understanding and use of community resources, it calls for contributions from medical social service departments, and from disciplines and professions outside the medical school itself.

As will be seen, in many schools one or more departments formally collaborate in teaching various aspects of preventive medicine. Teaching may include cooperation of several departments in general orientation courses, and conjoint courses in subjects such as infectious disease, industrial health, prenatal care or child health; it may take the form of lectures, clinics or conferences.

Cooperative instruction demands real effort in curriculum planning, and requires detailed and conscientious preparation on the part of the teachers involved. To students, however, it offers rewarding benefits, helping them to acquire a deeper and better rounded picture of the problems of health and disease.

Team Learning with Students in Related Professions

One approach that may be used to counteract the isolated nature of medical education is an experience where the teaching of medical students is combined with that of students in related professions, such as in medical social work, clinical psychology or graduate nursing training.

This can be accomplished as the student works with patients on the wards, in the outpatient department or in a home medical service. Responsibility for giving comprehensive care to these patients may be placed on a team consisting of the medical student and one or more students of these other professions.

In sharing mutual interests focused on the patient and his environment, and in meeting problems which require the cooperative efforts of each member of the team, all the students profit. The medical student may learn much more through this working association than from lectures or seminars by instructors from these allied professions, since such formal instruction may run the risk of losing sight of practical needs by focusing on theoretical or systematic considerations.

Examinations

Because at the present time grades are too often the goal toward which the student is working rather than realization of long-term objectives, some members of our conference urge minimizing the element of competition through examination and encouraging, rather, the student's realization of achievement for its own sake.

Since the present system of medical licensure is based primarily on examinations, however, they must be retained. "But," as was noted, "examinations can be given as voluntary exercises that are exciting and stimulating to the student. They can be made a matter of record, not for the purpose of promotion, but as an indication to both the student and the faculty as to the progress that both are making—the Saturday afternoon football game after the week's hard practice. The methods used should be mature ones, understood by both students and faculty. They should consider growth in knowledge, ability and skills, capacity to think like a doctor and to face and solve problems. Final examinations for purposes of promotion might well be given from outside sources."

This point of view reflects a different conception of faculty-student relationships from that often found today. At present, too often the teacher is regarded as the natural antagonist of the student; he has the power of the executioner if the student fails the examination. More desirable would be a relationship of colleagues in which both are seeking together to acquire knowledge and to solve mutually interesting problems. In short, the student thrives best when he is treated as a mature person; he is already involved in an important professional career.

III. Need for Evaluation Techniques

If the usual type of examination often fails to reveal much more than the student's grasp of particular facts in a particular subject, "there is a vital need on the part of the schools for instruments that will enable them to chart and guide an individual's progress in each important area of growth throughout his school career—not his growth in intellectual competence alone, but in all the skills, competences, attitudes, and understandings that go to make up an effective adult in our society."[2]

Many different groups are trying to devise such instruments on a scientific basis. Evaluation techniques, however, can be applied only when there is a clear definition of the particular thing to be measured: formulated objectives are prerequisite. Much still needs to be done in medical education to define objectives more precisely.

The impact of evaluation techniques themselves on students and teachers must be taken into account. How does the very process of testing and of answering questionnaires affect student and faculty attitudes towards the subject which is being measured?

Difficulties of evaluating teaching methods are generally recognized. Since

changes in medical education are suggested which represent a readjustment of current emphasis, however, our conference believed that the possibilities of measuring the effectiveness of these new approaches should be fully explored. Certain medical schools in the process of planning new programs have included efforts to develop techniques of appraisal along with the development of the programs themselves. Experiments along these lines are greatly needed. The conference regarded evaluation, generally, as a highly important area of research.

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Chapter IV

Teaching the Foundations of Preventive Medicine

THIS CHAPTER and the next deal with some of the possible ways by which various aspects of preventive medicine may be taught throughout the four years of undergraduate education. In this chapter instruction in the basic groundwork of the field is presented; the next considers teaching designed to show how the principles and practice of preventive medicine are applied in the care of individuals and families.

Since the enterprise of teaching preventive medicine is one which is shared by all departments of the medical faculty, discussion is not limited to presentation of material by a department of preventive medicine alone. We consider that opportunities should be afforded early in the curriculum to bring preventive medicine into focus in relation to the teachings of all other departments: in anatomy, physiology and biochemistry, for example; and later more directly in relation to all branches of clinical medicine.

I. Study of Health

An interest in health should be enhanced and augmented during the first year of medical training by instruction and experiences related to an understanding of health *per se*, and to its conservation and improvement. Disease may then be presented as a process which threatens the fullest potentialities of the individual. Much of the teaching in basic sciences can be presented from this point of view.

Correlations with Basic Sciences

Instruction in the basic sciences provides many opportunities to develop an understanding of the natural history of man in the study of normal development, structure and function of the human organism. The teacher of anatomy, for example, may emphasize to his students in the dissecting room that the structures they are examining retain their form and position because injury and disease have not affected them, and raise questions about the hazards these structures face in the living individual. He may point out how the structure of each organ makes possible its functioning, and how the various parts are inter-related in the entire person when alive. Sometimes an imaginative instructor will carry this idea much further and include living individuals in his anatomical demonstrations, or even remind his class of the fact that the cadavers being studied were once persons living in society, with the problems and the potentialities of all human beings. The same principles obviously are applicable in the teaching of histology. The

study of embryology offers opportunities to consider the role of genetic factors and antenatal environment in determining the constitution and potentialities for health of the individual.

The teaching of physiology illustrates preventive principles at many points. An understanding of normal bodily functioning underlies the efforts of the physician to maintain this functioning in as normal a state as possible. In the study of the respiratory-circulatory functions, for example, the extraordinarily delicate balance of numerous complex factors that is required to supply oxygen and other substances to the tissues provides an excellent basis for demonstrating factors that may upset that balance and, in turn, the ways in which measures may be taken to prevent such an upset. Similarly, an understanding of the physiology of the nervous system implies an appreciation of its integrative action and, therefore, how this action can be interfered with by various agents, and what can be done to prevent interference.

Pharmacology and biochemistry also involve an understanding of the concept of homeostatic processes in health, as they can be determined chemically or metabolically. These subjects are obviously basic to the teaching of such things as nutrition and toxicology. All of these matters, of course, closely relate to the understanding of human ecology which is basic to preventive medicine.*

Early Correlations with Clinical Subjects

A teaching program at the UNIVERSITY OF COLORADO illustrates a type of presentation where the basic sciences are integrated with clinical subjects in a 64-hour course for first-year students, "Medicine as Human Biology."† The growth and development of an individual as both a social and biological unity is studied. Representatives from the fields of anatomy, human growth, medicine, pediatrics, physical medicine, psychiatry, preventive medicine and social science participate in teaching. Alfred H. Washburn describes this program as follows:

> "With a strong feeling that an understanding of the growth, the maturation, and the adaptations of the human organism should be the continuous theme which integrates the basic sciences and the clinical subjects alike, we started a series of exercises for the freshman class. These exercises run through the first half of the first year, starting on the opening day of school. They consist of lectures, demonstrations, seminars and informal discussion groups. The purpose, which is to introduce the students to the concept of medicine as human biology, involves a consideration of how the medical and related sciences contribute to our understanding of the growth, development and adaptation of any given person who will, one day,

* The next conference sponsored by the Association of American Medical Colleges, to be held in October 1953, will be concerned with seeking the most effective ways whereby this triad of physiology, biochemistry and pharmacology can contribute to the education of a physician.

† Throughout the remainder of this report, teaching content and method are frequently illustrated by descriptions of specific programs at various schools. In general, the programs described were chosen because they were discussed at the conference. Many of them represent experiments in teaching. Others illustrate the more established type of program for teaching preventive medicine.

be the student's patient. Physical growth, personality development and the course of physiological and biochemical functions from the fetus to old age are discussed with special emphasis, of course, on the period from birth to maturity. Examples of distortions due to disease are demonstrated and discussed by several faculty members representing different departments.

"This is admittedly an educational experiment. The four years during which it has been in progress represent too short a time for any but very tentative conclusions. However, I think there is already evidence that the junior and senior students have a somewhat different attitude than formerly. They seem definitely more aware of the need to understand their patients as people with many factors and problems which affect the significance of the symptoms they present. Their questions show at least improvement in their understanding of the interplay between psychological and social factors which are involved, as well as in the part played by previous life experiences. If our own knowledge were more adequate we could be of greater service to them.

"I believe the better students are receiving good stimulus to go on studying and learning from their own experiences. And I'm sure these exercises have given many of the students better insight into their own selves as the instrument they must use in observing and interpreting the patient's deviations. And, finally, I believe that the 15 participating members of the faculty, coming from eight different departments of the school, have also learned and been stimulated to further learning."[1]

Observation of Normal Persons

As indicated earlier, we believe that it is valuable for the student to have frequent contacts with normal individuals during the early years of the curriculum, to keep alive his interest in human beings as such and to minimize the tendency to split the human organism into disparate entities which may arise from the bare study of basic science. Also, learning about the processes of growth and adaptation can be usefully buttressed by observation of these processes in living human beings.

Well-baby clinics offer one useful way to show normal growth and development. Physiologic adaptations and changes of adolescence and later life likewise may be demonstrated through clinical observation. Programs offering long-term observation are particularly valuable:

In the curriculum initiated in 1952 at WESTERN RESERVE, there is such a program for first-year students. The student is assigned to a particular obstetrical case to follow in the home, outpatient department and wards, through the prenatal care and the delivery. He then continues to follow the case, observing the growing baby in the home and clinic. The duration of the follow-up observation has not yet been determined, but will probably be not less than two years.

This program, of course, offers many benefits besides the opportunity of observing the normal processes of growth. By such relatively long observation the student sees preventive medicine practiced, both for the mother and the baby, gets to know the family and its problems well over a continuous period of time, and thus sees its needs as a whole, though different teaching departments are involved; observes

how different doctors may deal with the same patient; and sees the functioning of the medical team, here represented by at least two special fields of medicine, as well as the social worker and the nurse.

For four years, the UNIVERSITY OF PENNSYLVANIA has had a program designed to give the student frequent contact with normal individuals in their homes. First-year students may elect to take part in a family health advisor service operated under the joint auspices of preventive medicine and psychiatry:

> Here the student is provided contact with a carefully selected family which he follows throughout his four years of training as its health advisor, at home and through its hospital experiences. The objective is to stimulate the student to study all those factors in the family which make for health or disease: the kind of house they live in, the food they eat, their ways of living and, more importantly, their reactions to their life and to each other. He learns to think in terms of the family unit, and what may be done to help keep its several members healthy.
>
> One of the values this program offers to students is the realization that it is not an easy matter to get this requisite information. Only as he has time, through repeated visits, to gain the confidence of all members of the family and to seek beyond the obvious presenting factors is it possible for him to try to deal with all the elements involved in promoting the health of the family unit.
>
> Members of the departments of medicine, preventive medicine, psychiatry, pediatrics, surgery and social service participate in the program. For teaching, the class is divided into groups of eight students. Each group is supervised by a faculty team of three: two clinicians, one of whom is a psychiatrist, and a social worker.
>
> In his first year, the student is obviously not prepared to cope with the problems of illness. However, he does learn some of the problems he must later deal with as a physician. During the latter years of his training period, he not only observes but has a natural and gradual increase in responsibility as he endeavors to help the family meet its medical care needs. He actively participates in a program of health maintenance for the family and is concerned with: health supervision for the infants and pre-school children; follow-up of school health programs; the nutritional status of the family; the emotional tensions of intrafamilial relationships; the detection and management of chronic disease and the problems of the aged and senile.[2]

Another example of observational and participating experience of ostensibly well people, though limited to fourth-year students, is at JEFFERSON MEDICAL COLLEGE:

> Here the department of preventive medicine operates a health maintenance clinic, supported by the college in a health center jointly sponsored by voluntary health agencies and the health department of Philadelphia. When medical problems arise, other clinics are available for coordinated care of the patient. Students act as clinical clerks, performing health examinations and making a detailed study and inquiry into individual behavior and environment.
>
> "Here we can observe apparently healthy people. They come for assistance to keep well—this is our laboratory of clinical preventive medicine. The main point

is that teaching in this area can best be done outside of an atmosphere in which sickness predominates."

Special Correlations with Pediatrics and Psychiatry

For study of factors contributing to health, most of the programs described above correlate teaching from various departments, especially, as might be expected, from pediatrics and psychiatry.

The teaching of psychiatry in the early years of the curriculum is particularly concerned with normal growth and development and with the realization that homeostasis and stress are basic factors in psychology. It is sometimes taught in terms of defense mechanisms, how these are broken down and pathologic manifestations occur. As was stated in the report of the 1951 Conference on Psychiatric Education, "The physician in his professional responsibility to families and their children must have some useful understanding of the basic processes of personality growth and maturation if he is to provide guidance and assistance in overcoming individual maladjustment. . . ."[2]

Likewise, since child health supervision depends to a large degree upon knowledge of normal function and growth, the pediatrician has a particular interest in the natural history of man from birth through adolescence. His concern is that each child live up to his genetic potentialities. Since attention to the health of the well child has become such a large part of the day's work of the pediatrician and figures so prominently in the practice of general medicine (see Chapter I, p. 5), medical school departments of pediatrics are giving students more and more direct opportunities to become familiar with normal developmental processes, through examination of well babies, participation in well-child conferences, and through talking to parents both at clinics and in their homes about the many emotional and psychological problems involved in the rearing of healthy children.

Thus, the teaching of human development from many points of view seems to lend itself to integrated teaching by different departments of the medical school. It is also an area where many nonmedical disciplines can contribute to the student's learning.

The child development clinic at the UNIVERSITY OF WASHINGTON demonstrates such an integrated team approach by several specialties and disciplines to better understand child development. It is jointly sponsored by the local and state health departments, the department of pediatrics and the department of public health and preventive medicine. On the staff (full- and part-time) are pediatricians, psychiatrists, psychologists, social workers, nutritionists, dentists, dental hygienists, public health nurses and various technicians. A cultural anthropologist participates at times. The clinic is used extensively by the various specialties mentioned above for teaching.

II. The Natural History of Disease

As students begin to consider the processes of disease and later as they learn measures of prevention, diagnosis and treatment, they should learn to regard

disease in relation to its natural history, and in relation to all the kinds of factors within man himself and within his environment that affect this natural history.

If a student sees a child with rheumatic fever, for example, he should visualize this child not only as one individual with a collection of certain symptoms, but as one of several hundred thousand children with the same condition. He should realize that this condition, if its natural history is not interrupted by continuous preventive measures, will cripple or kill a predictable number of these children after a predictable number of years. He should know that rheumatic fever seems to be associated with a particular grouping of related factors of geography, hemolytic streptococci, and susceptible individuals (or families). Further, in considering possible measures to prevent recurrences in this child, he should learn to recognize all the factors in the home situation and in the attitudes of the family which may need to be modified to insure that prevention can be carried out, and to know how to secure additional help in seeing that these things are done.

Epidemiology and biostatistics are the keys to open up this approach to disease by students, elucidating the natural history of any disease in terms of agent, host and environment, and demonstrating the extent of this disease in a population, and its effect on the morbidity and mortality of the group.

Students should discover that "... the fields of clinical medicine and epidemiology are mutually dependent. The epidemiologist depends on good clinical diagnosis, and the clinician must of necessity use epidemiologic knowledge in his daily attention to patients and their families in the struggle against disease, defect, disability and death. Epidemiology furnishes strategic analysis; clinical medicine and public health furnish the tactical aspects or the specific details of how the action is to be performed.... Whatever is discovered from study of aggregations of individuals can be applied to the individuals making up the aggregation. The two approaches advance together and collaborate in formulating principles of preventive medicine that can be applied on an individual or community basis."[4]

Biostatistics

We believe that it is important that all medical students receive statistical instruction. It is not enough that they simply be made aware of the contribution of biostatistics, to learn to call for consultation when necessary. It was noted that in 1952, 67 out of a total of 82 schools who responded to a questionnaire on the subject reported that they taught biostatistics to some extent.

We reviewed a recently released report of a committee of the American Public Health Association dealing with training in medical and public health statistics, and were in general agreement with it.[5] This committee held that statistics may best be taught during the second year; that no less than 25 hours be provided for the instruction; that teaching be connected with practical application; and that it be conducted by professional statisticians well oriented in medical problems.

Biostatistics can be taught to students in a provocative and stimulating

manner. Presentations emphasizing the intelligent use of this discipline in medicine, rather than statistical techniques and equations, are most effective. Biostatistical principles can be illustrated by the use of data collected by the students themselves as, for example, those obtained from laboratory exercises in the counting of blood cells, or from the determination of the toxicity of a drug. Frequent return to the biostatistical aspects can be accomplished throughout the four years of undergraduate experience. One of the important objectives in teaching biostatistics should be to emphasize to students the contribution they can make as practitioners towards the accumulation of biological data.

Biometry—Through biometry, students should gain a basic understanding of scientific methodology and exercise in its application. Instruction in this field might well begin in college. A possible objection to this is that such instruction might be purely mathematical and not related to the biologic phenomena with which medical students will be dealing. In any event, biometry should be introduced early in the medical curriculum so that it can be used both in epidemiology and in preclinical courses of biochemistry, physiology, pharmacology, and so that the student can have increasing confidence in the uses of this valuable tool in the later years of medical school, and subsequently.

The department of preventive medicine usually teaches biometry; but since a number of other departments are vitally concerned with biometric methods, primary responsibility might lie with any department. Wherever teaching is centered, it would seem essential that there be exercises in conjunction with lectures; if students apply statistical methods to the evaluation of data it clearly quickens understanding of the value of these techniques and develops abilities to use them.

One possibility is to use these methods in critical examination of recent medical literature, giving students opportunities to appraise the data, show where the controls were good or deficient, and to go through the steps of analyzing the material. This also helps students become practicing physicians who will evaluate for themselves, and thus effectively keep up with advances in medicine.

It is generally agreed that active participation of the student in a research exercise facilitates learning. At PITTSBURGH, for example, students in preventive medicine learn the methods used in setting up a particular long-term population study, being conducted as a research project at this school. Then they visit people's homes to gather some of the pertinent data needed for this study. In this way the student not only learns the importance of correct design of an epidemiological study, but also sees at first hand the kind of variables that must be taken into account. He derives corollary benefits from such an exercise since his attention is directed to factors of health and disease in a random population sample which includes people who are healthy as well as those who are sick—and sick with various disorders in presumably the same proportion as the community at large.

In citing this example of a research exercise, it should be emphasized that participation in any research project designed to show a medical student how he

can apply the principles of scientific methodology to a particular problem has value in whatever field the exercise is carried on. The development of the scientific approach to problems is the primary goal:

For example, a student research program at UTAH, conducted through the department of pharmacology, was noted with particular interest.

> When this program was initiated, the department concentrated its formal laboratory course into one quarter, instead of having it spread out over the department's time in two quarters, as formerly. Thus the laboratory period for the second quarter became entirely free for the student research program.
>
> Students divide into groups of four or five. They have a list of about 20 projects from which they can select. After choosing a project, the students design a finite experiment with the assistance of their instructors, one of whom is a biostatistician, and work at it during the hours allotted to pharmacology. In preparing their reports they are permitted to have art work performed, and to have lantern slides and motion pictures made if necessary. A series of scientific meetings is conducted at the end of the projects, in which all students take part in the presentation of their work. Meetings are often attended by preclinical faculty members from other departments. The best research projects are worked up and presented at the Federated Societies, often by the students themselves.
>
> This program, in progress for eight years, is thought to have been extremely valuable from many points of view, and students are generally enthusiastic. It does depend, however, on a large pharmacology staff, a favorable teacher-student ratio and sufficient funds for research. A comment of interest was that "the students feel that their inquisitiveness about patients is tremendously increased over what it would have been."

Considerations in Planning Student Research Programs—In developing research programs in departments of preventive medicine that can be used for teaching, a number of points must be considered.

First, the research problems must be of a nature to demand true exercise in the scientific method by the student, not mere scutwork participation. Second, all students who wish to take part in the research program should be able to do so. This requires a flexibly designed program and adequate curriculum time.

In planning such programs, the benefits of integration with the research programs of other medical school departments should be recognized as a means to demonstrate the relationship of the disciplines of preventive medicine to other disciplines. Likewise, the benefits to students of taking part in programs where the community is used as a laboratory must be considered. Finally, there is need for experimental testing of the accomplishment of the program, to determine its value to students.

Vital Statistics—Since this subject concerns population characteristics and the importance of mortality and morbidity reporting in relation to the health and welfare of the community, the logical time to present it would seem to be concurrent with instruction in the characteristics of the community and the activities of public health departments. It should be taught at the time of or following the

student's instruction in recognition of disease, in order that he may appreciate the relationship between individual and aggregate disease.

Teaching can be done by a series of basic lectures, demonstrations and laboratory periods during which the student himself handles pertinent data and standard report forms.

While vital statistics is customarily taught by the department of preventive medicine, other clinical departments are naturally concerned as diseases are studied and births and deaths reported.

Students, who as physicians should be accurate reporters of disease, must understand the problems of the classification of disease and the problems presented by joint causes of death. The accumulation of factual information on the incidence, distribution and trends of disease in a population is, of course, the basic tool for diagnosing disease in this population. Students should appreciate that for the community, as for the individual, preventive and therapeutic procedures must be based on accurate diagnosis, and that physicians, as reporters, are essential to establishing such diagnosis.

They should also appreciate the many limitations of present reporting—that although historically the control of certain communicable diseases was predicated on the accumulation of evidence of incidence, sensitive indexes are lacking to measure the kinds of diseases that demand attack today such as mental illness, arthritis, cancer and heart disease. By understanding the importance of morbidity reporting, they will be prepared to cooperate, when and if methods can be devised for measuring these diseases more accurately in the population.

Epidemiology

The wide variety of disease agents contributing to the occurrence of disease and the multiplicity of reactions to these agents require that instruction in epidemiology should be given early in the medical curriculum, concurrent with or immediately following the presentation of disease agents and of pathology, in order that the proper correlations in instruction may be made. Its teaching is generally carried on by the department of preventive medicine.

As was stated in Chapter II, for teaching purposes epidemiology may be considered from two standpoints: its basic principles, historical development and its collective and constructive characteristics; and the body of knowledge amassed to describe the natural history of a particular disorder.

The *principles of epidemiology* may be taught by reading, lecture and seminar. Here the student should acquire a picture of the factors that influence the occurrence and distribution of disease, defect, disability and death in aggregations of people; the methods for measuring disease in populations, and the methods for tracking it down to its origins, with the view to applying preventive measures for the whole population or for individuals.

The variety of factors that may be pertinent in understanding the natural history of disease should be stressed. Where there is a teaching experience that takes

students into patients' homes, the student's direct observations of environmental factors can be correlated. The student should learn that environmental factors are not limited simply to such matters as climate, sewage disposal or occupational hazards, for example, but in varying degrees may relate to social structures—the traditions, fads or customs of groups of people, or to psychological stresses arising from changes in this structure. As an example of the latter, there are undoubtedly effects on the mental health of the aging that are influenced by changes in the concept of family responsibility. Instruction by sociologists may be usefully correlated with this teaching, and the methods used by social scientists in attempting to describe a given culture and to measure changes within it may be illustrated.

In connection with basic teaching in epidemiology or in discussions of the epidemiology of particular diseases, the fields of research in preventive medicine can be described. The fact that epidemiology and biostatistics are indispensable for determining reliably the efficacy of therapeutic and prophylactic measures may be demonstrated.

An exercise that may be rewarding is the preparation of a term paper on the epidemiology of a particular disease. Besides introducing the student to the stimulating concept of disease as an ecological phenomenon in the community, as distinguished from a disease process in an individual patient, the student gets practice in the use of the medical library and in correlating factual information from many sources.

Study of the kinds of knowledge amassed to describe the natural history of a particular disease can be demonstrated by detailed consideration of specific diseases or conditions, communicable and noncommunicable. Teaching the use of epidemiological methods in the prevention of disease should be stressed at the time particular diseases are studied in various departments.

One teaching method is to present disease from the point of view of its natural history, in terms of agent, host and environment, and to illustrate preventive measures in these same terms according to the various levels of prevention. For example, in studying syphilis, first the extent, trends and natural history of the disease in the population is described. It would be shown that syphilis as it progresses may be symptomatic or asymptomatic; early or late; infectious (primary, secondary and infectious relapse) or noninfectious (late). There are certain percentages of "spontaneous cures" or life-long freedom from symptoms, while among others in the population the disease may result in death, defect or disability.

Successively, the agent factors are explored—in this case the biologic requirements of the treponeme. The receptivity of the host to the agent, and the host-agent interaction are studied—the course of syphilis in the individual. The effect of environmental factors is measured or described (in this particular disease they cannot be measured with precision), and their relative importance to the causation and control of the disease is studied. For example, it is noted here that the environmental factors involved in acquiring syphilis are very complex, having

their origins in variations of human behavior, in sexual promiscuity, in marital maladjustments, and in some of the inadequacies of our social and economic life; they are rooted in prudery, ignorance, and defeatism on the part of the public.

Finally, the application of preventive measures at the various levels can be described, as has been shown by Leavell and Clark, in the following chart:[4]

APPLICATION IN SYPHILIS OF PREVENTIVE MEASURES BASED ON NATURAL HISTORY

Level of Prevention	*Agent*	*Host*	*Environment*
Health Promotion	Avoidance of disease-producing microorganisms by health education in hygiene	Sex education, preparation for marriage, premarital and prenatal examinations as part of general checkup	General improvement of socio - economic conditions, recreational facilities
Specific Protection	Prophylaxis, chemical, mechanical and chemotherapeutic	Prenatal serologic examinations, avoidance of sexual promiscuity	Eradication of commercialized prostitution, precaution in handling discharges of syphilitic infants
Early Diagnosis and Treatment	Adequate treatment to destroy *T. pallidum*	Case finding for early syphilis, advice re infectiousness, immediate and adequate treatment, contact investigation, examination of infants of syphilitic mothers at birth and regularly for three months, routine examination of cerebrospinal fluid	Educational media showing early symptoms, and urgency for early diagnosis; adequate diagnostic, treatment and contact investigation facilities
Disability Limitation	Fever and other treatment to destroy *T. pallidum* in brain of those with paresis	Case finding for latent syphilis and for early signs of late syphilis; adequate examination of heart and central nervous system; routine examination of cerebrospinal fluid; adequate treatment	Educational media showing effects of non-treatment; provision for low cost treatment facilities for complicated syphilis
Rehabilitation		Preparation for blindness in primary optic atrophy, rehabilitation of the blind and of patients with tabes, paresis and advanced cardiovascular disease	Improvement of working conditions of the disabled; the cardiac patient, the paralyzed, the blind

This type of presentation, by levels of prevention according to agent, host and environment, of course lends itself to description of any disease or condition. It

is suitable for presenting such diverse problems as accidents, goiter or mental illness, for example, although there are as yet many gaps in our knowledge.

Teaching from Various Departments—Whatever methods are used to describe the natural history of a disease, instruction from a number of different sources may be integrated to give the student a comprehensive understanding of the particular disease under consideration and to coordinate the teaching of preventive and curative medicine.

To use rheumatic fever again as an illustration, this disease may be presented jointly by representatives of several departments such as medicine, pediatrics, psychiatry, microbiology and preventive medicine. The epidemiological aspects of the disease may be presented by the departments of preventive medicine and microbiology; the clinical features of rheumatic fever by the pediatrician; the personal aspects by the psychiatrist; the natural history of streptococcal infections leading to rheumatic fever and rheumatic heart disease and the preventive aspects of the treatment of asymptomatic heart disease may be presented jointly by the internist and the representative of preventive medicine; the treatment of heart failure by the internist; the social factors by the social worker, and the nursing aspects by the public health nurse.

The following outline of two three-hour sessions on cancer illustrates this method of teaching through the department of preventive medicine at HARVARD. In a course for third-year students, disease in the individual and its distribution in the community is taught through cooperative efforts of instructors representing various clinical and nonclinical fields, using clinical material where appropriate. Instruction is also provided by qualified personnel from sources outside the medical school itself.

THE NATURAL HISTORY OF CANCER

Topic	*Instruction from*
	Session I
1. Distribution of cancer in the population	Epidemiologist from state health department and department of preventive medicine
2. Pathology of tumors	Department of pathology
3. Carcinogenesis	Department of chemistry
4. Occupational cancer	Department of preventive medicine
5. Precancerous lesions	Department of surgery
	Session II
1. Screening well populations	Department of preventive medicine
2. Principles of diagnosis	Department of medicine
3. Principles of treatment	Departments of medicine, surgery and radiology
4. Management of the patient with cancer	Social service worker, and public health nurse from Harvard School of Public Health

The natural history of other conditions, such as tuberculosis and certain occupational diseases, also may be demonstrated by similar cooperative instruction. In teaching about tuberculosis, for example, instructors may be drawn from the departments of medicine, pediatrics, preventive medicine, radiology

and surgery, and from a school of public health, a state health department and a county tuberculosis sanatorium.

In some schools, the department of preventive medicine is responsible for teaching students to diagnose communicable diseases in connection with the study of the epidemiology of such diseases. Although this is a useful way to tie in epidemiological method to clinical medicine, we believe that such correlations should be far more generally applied to all types of disease.

Clinical epidemiology stresses the relationship between the person and his family, particular neighborhood, occupational or other group; it alerts students to search out situations under which disease is developed in the family unit, the object being to bring influence on these situations themselves as well as upon the patient. This, of course, is the cornerstone of the family practice of medicine. As someone stated, "The search for causes . . . branches out into seeking areas where illness began, the analysis of the intimate details of origin, the search for others in the group who are ill or potentially so. This places the patient in a group to which he belongs, instead of regarding him as a lone sick individual suddenly appearing from nowhere."

How clinical epidemiology is presented at YALE, where preventive medicine is taught in proximity to the patient's bedside, is described as follows:

> "In a weekly preventive medicine seminar for third-year students, discussion starts with a critical review of the accuracy of the diagnosis and presentation of what is known about the epidemiology of the disease in question. If possible, some pertinent data are shown, either on a lantern slide or in tabular form on a blackboard, to indicate certain known circumstances in which the disease in question usually occurs, together with a discussion of multiple causes and a listing of the various factors thought to be of etiologic importance, or of importance as predisposing elements.
>
> "The past history of the patient is then reviewed step by step in the light of the epidemiological data; the patient's present condition is reported and the prognosis discussed. These are all reviewed before the attempt is made to predict how the situation which led up to the patient's illness might have been altered, how the situation should be handled from the standpoint of prevention after the patient leaves the hospital, and how a similar situation with another potential patient could be handled."*

Correlations with Microbiology and Pathology

In the demonstrations of natural history of disease illustrated above, it is seen how instructors from many departments, preclinical and clinical, may cooperate in the teaching programs of a department of preventive medicine. Many aspects of the natural history of disease are elucidated through the teaching of basic science departments.

* See footnote reference p. 33.

Historically, preventive medicine owes more to microbiology than to any other preclinical field. In some schools the basic principles of epidemiology are introduced in departments of microbiology. When this is done, care must be taken that epidemiology's contribution to the study of noninfectious disorders not be lost sight of.

The microbiologist has an unusual opportunity to touch on many areas of preventive medicine when he presents his material from a broad biological viewpoint. The dynamics of the host-parasite relationship bring the student into contact with ecologic concepts and focus his attention on micro-organisms as living entities which, like man himself, have their own complex interactions with their environment. In some instances, such as equine encephalitis or trichinosis, infection of man is only an accidental incident in the natural life cycle of the virus or parasite. On the other hand, as in typhoid and group A streptococcal infections, man is apparently an essential reservoir of the etiologic agents. Thus intelligent health protection demands a knowledge of the parasite and its natural history as well as a knowledge of the disease it produces in man. This subject readily extends into immunization, chemoprophylaxis and other methods of specific protection.

In the field of pathology much more is involved than the description of the morbid process. The clinical history and course of the disease must be related for the student to the pathologic findings. The management of the patient is re-evaluated with a view towards determining what might have been done towards minimizing illness and preventing death. In the clinical pathological conference the student may review the case in terms of some such questions as the following: Could life have been prolonged? Could circumstances of death have been avoided? Could preventive measures have been applied? What reasons were involved for not applying them? What should we do in the future to avoid these consequences in others? All these questions lend themselves to study in terms of the natural history of disease.

At the UNIVERSITY OF KANSAS, a new program of integrated teaching of the second-year medical students illustrates one way in which these and other correlations may be encouraged:

> In this program, much of the related material during the second year is given concurrently in an integrated program of teaching by the departments of microbiology, pathology, pharmacology, physical diagnosis, and public health and preventive medicine. For example, while learning about tuberculosis, as the student studies its cause in microbiology, he studies the pathological changes in pathology, and the clinical findings in physical diagnosis. Simultaneously, he is studying the antibiotics useful in tuberculosis treatment in pharmacology, and prevention and methods for control of the disease in preventive medicine.
>
> One morning each week a two-hour integrated seminar is held. Here, a disease or closely related group of diseases is selected as the topic, related to the instruction

during that week. Representatives from each of the departments, including clinicians, are on hand. Whenever possible, patients are also present.

Integration also is applied to examinations, both written and oral. The emphasis in these examinations has been changed from the course to correlated questions on the subject of the biology of human disease.[6]

III. Study of Environment

Community Health Resources

As the student learns through study of epidemiology the complexity of the problems involved in any disease, he also learns that to attack these in any fundamental way requires partnership between the individual physician and organized community effort. He can visualize the varied kinds of resources needed for such an attack in terms of our same *levels of prevention*.

For effective *health promotion*, for example, maternal health services and health supervision of the growing child are furthered by activities such as public health or school health programs, which educate patients to seek physicians' care or bring it to them.

As the physician helps the patients under his supervision in meeting many problems which may affect their health such as maladjustment, dependency or inadequate diet, he relies on other kinds of community services such as a mental hygiene clinic, a family aid society or a welfare department.

Measures for *specific protection* obviously require public health services for environmental sanitation and communicable disease control, and industrial safety programs to eliminate or minimize occupational hazards. The physician protects his patients against disease through active and passive immunization procedures, and through education of the family for control of disease-producing situations in its immediate environment when this is necessary.

For *early recognition and prompt treatment* of disease, a high index of suspicion on the part of the physician in every field of medicine and surgery of course is required, as well as good training and continuing education. For its part in helping make diagnosis possible, the community must provide x-ray and laboratory facilities in its hospitals and health departments.

Partnership also is needed to bring patients to seek early diagnosis and treatment. A record of wise and considerate care by the physician certainly helps influence patients to seek early diagnosis, and helps motivate them to follow treatment, but at the same time educational programs by voluntary or official agencies are necessary to impress on members of the general community the importance of attention to health. Though the physician may encourage patients to come for periodic health examinations, particularly at times of life when stresses are heaviest and when certain diseases are most apt to occur, and in connection with certain kinds of employment, many people in the earliest stages of diseases such as tuberculosis still must be found through organized case-finding

programs. Multiphasic screening programs and routine examinations in industrial health departments may also bring patients early to physicians for treatment.

Finally, as the physician provides reports on natality, morbidity and mortality for recording and analysis by the official health agency, this analysis in turn gives him an up-to-date epidemiological scorecard, helping him to be on the lookout for prevalent diseases in the community.

If the physician is to institute treatment of a known condition with requisite dispatch, he may need to enlist aid from any one of a number of community services to make this possible. The father of a family who is told he must lay off work for a long period of hospitalization, for example, may fail to do so if his family is left without means of support. Introducing the family to agencies equipped to solve such problems may often mean the difference as to whether needed treatment is given promptly or delayed to a point where the condition is far more difficult to control.

Follow-up measures to determine whether a patient with a suspected or diagnosed condition has sought physician's care are another important way in which community health services function at this level.

As the physician carries out therapeutic procedures aimed at *disability limitation*, he needs many kinds of facilities within the community: general and special hospitals, nursing homes, sanatoria, ambulance service, blood banks and so forth. For proper care of his patient at home he may need to call on community agencies providing visiting nurses or housekeeping aides.

Again, in many of the family problems caused or aggravated by illness, he will want to work closely with various social agencies, helping relate the medical aspects of the problem to the total family problem in cooperation with the professional worker assigned to help. Such teamwork is particularly necessary in trying to devise the solution of difficulties that arise in a family where there is chronic illness.

Probably more than at any other level, however, *rehabilitation* of the patient calls for close partnership between the physician and community agencies. In situations where a disability is likely to be permanent, the patient's attitude in large measure determines his future success in making a life that is as happy and useful as possible. Much depends on the physician's early emphasis to this patient and his family on the possibilities for making use of his remaining assets. Therefore, beyond seeing that the patient has access to the range of restorative procedures, it is the physician's responsibility to put the patient in touch with other rehabilitation services as early as possible.

The success of these services in achieving maximum rehabilitation, however, depends heavily on the cooperation of the physician; occupational therapy, vocational guidance, training and job placement all depend on a thoughtful and accurate medical evaluation of the patient's capabilities. Finally, informed leadership by physicians can help to stimulate the provision of needed rehabilitation services by the community.

These levels of prevention can be used to illustrate the necessary partnership between the individual physician and organized community activity in terms of the prevention or control of any specific disease or disorder, according to the knowledge and resources presently available. (See chart p. 49)

General Orientation—To become an effective partner in the shared enterprise of health, it is essential that the student understand the general nature and purposes of the community resources with which he will be working. As a physician, he will be spending a large part of his professional life working in hospitals and in cooperation with many other institutions and agencies, both voluntary and official. These relationships will be most profitable if he has some knowledge of the history, background, significance and methods of operation and control of important community resources.

As part of a student's general orientation, a historical view of the development of community agencies is most valuable: how hospitals evolved from the pesthouses of the past to the essential health facility they are today; why voluntary agencies are controlled by lay boards of trustees instead of the professional workers who staff them; how health departments' responsibilities have evolved from simple concern for control of particular aspects of the environment to their present program, which embraces a wide range of activities for community health; the trends in shared and differing responsibilities of voluntary and governmental agencies; the increasing need for teamwork between different groups to achieve coordinated service and similar considerations.

Instruction about community health resources is given by departments of preventive medicine at different points in the curriculum. In some programs such teaching begins as early as the first year and continues to a greater or lesser extent throughout the entire training period. These activities may be observed in connection with family health advisor and domiciliary care programs, where the student sees a variety of resources called into play to meet the needs of a particular family, and through direct observation of the agencies themselves. For example, in the family health advisor service at PENNSYLVANIA, described earlier, after becoming familiar with the problems of his assigned family, the third-year student visits the particular agencies touching on the health needs of his family—a rehabilitation agency, child guidance center or whatever.

Field visits may be made by small groups of students to the health department, to social agencies, etc. There is value in such visits, but best results are obtained when there is some formal orientation as to what health facilities are available, with conferences both before and after the trip to clarify the functions of these agencies. Slides and moving pictures are useful in preparation for field trips.* It is, of course, essential that the objectives of these agencies be understood and that students know in advance what particular things to look for.

*The use of audiovisual aids in teaching various aspects of preventive medicine is discussed in Appendix E.

The agencies visited must understand and be sympathetic with the purposes of the trip.

Experience in Community Agencies—To insure that the student will learn to use community facilities as a practicing physician in his own community, it was the consensus of our conference that more is accomplished through training experiences in connection with such agencies than through simple field visits. This usually involves participation by one or several students in the activities of selected social or public health agencies. The period of time devoted to such experiences must depend on the availability of facilities suitable for teaching, the time available, and the needs and interests of the student. Elective projects in local health departments or social agencies, so-called internships in preventive medicine, and health resources surveys are some of the methods that may be used.

The following example shows how students learn through community agency participation at the STATE UNIVERSITY COLLEGE OF MEDICINE AT NEW YORK CITY:

> A limited number of first- and second-year students may elect assignment to family social agencies, one half-day weekly for eight weeks, and participate in the solution of short-term problems of selected families. Besides learning to appreciate the role of an organized community agency and the assistance it can be to the physician, this program seeks to provide experience in the art of establishing a professional relationship.
>
> Students are assigned in units of three or four. After suitable explanation of the functions of the family agency and study of sample records, each student is assigned one or more clients and represents the agency in the counseling function that follows. Sample cases include the placement of homemakers in families where the mother is sick, the return of institutionalized delinquent children to their homes, etc. The student is not given complex counseling problems, and is supervised carefully by the agency. He conducts his interviews in an office assigned to him in the agency, and in the homes of his designated families.
>
> Not all the problems that the student encounters have medical connotations. During this brief experience his role is not that of medical student or "doctor," but that of a regular member of the agency receiving in-training. Since the elements of a professional relationship are present in full, the program provides a means for the beginning medical student to be rapidly oriented to participate in such a relationship. He is helped to understand that the objectives of a professional service are best accomplished by working out solutions *with* patients, and not *for* them, to appreciate the significance of certain social problems and the response of the community in their management, and also to identify some of his own personal problems in establishing a proper rapport with people for whom he has a responsibility.

A similar type of program, though centered around particular types of medical or social problems, is found at the ALBANY MEDICAL COLLEGE:

The department of preventive medicine and public health begins to lay the groundwork for an appreciation of what is meant by comprehensive medical care through a course in social and environmental factors in medicine, which is offered to the first-year students.

In this course, the importance of sustaining and improving health is emphasized. The repercussions of social and emotional complications upon incipient and existing disease are taught by lecture and seminar, and are demonstrated in relation to their effects upon the family and the community through supervised case studies of patients and their families made by the students. The necessity for the simultaneous operation of four professional groups in a team-relationship is brought home to the student. These four professional groups are the family physician, the social worker, the public health nurse and the hospital with its medical specialty services.

Formal lectures are restricted to two introductory hours. Then, after an individual conference with the director of the program, the student is assigned to work at one of the 26 collaborating agencies for practical field experience with patients and families. Under the heading of the major type of health or social problem they demonstrate, a few of these agencies are listed below:

Family problems in mental hygiene,
New York State Department of Mental Hygiene.
Repercussions of tuberculosis in the family,
County Tuberculosis Association.
Social problems related to medical practice,
Visiting Nurse Association.
Medical, psychiatric, and social problems in alcoholism,
Schenectady City Health Department; Alcoholics Anonymous; Schenectady City Police Court; Psychosomatic Clinic, Ellis Hospital. (These four agencies provide an integrated program.)
Emotional and social repercussions of cerebral palsy,
Clinic, Capitol District Cerebral Palsy Association.
Problems of retirement and aging,
Senior Citizens Center.
Medical Service, County Home for The Aged.
Contribution of vocational rehabilitation to problem of total medical care,*
State Department of Education, Division of Vocational Rehabilitation.

At the agency the student may be assigned to the staff, after a period of orientation, and allowed to do intake interviewing. Special problems amenable to short-term resolution are selected and a series of interviews is arranged for the student, including home visits.

"Among other outcomes it is anticipated that the student will develop respect for the social worker and accept this person as a future team worker. A broadened horizon relative to the field of legitimate medical problems is another consequence,

* Other problems demonstrated through experience in agencies are: problems in emotional adjustment of children; problems in the institutional care of children; counsel for the unwed mother, problems of adoption; contributions of hospital social services to the practice of medicine; contributions of a counseling agency to family welfare; counseling activities of a county agency in problems of children; problems of neglected, abandoned and delinquent children; problems in rehabilitation of the blind.

along with an appreciation of the factor of chronicity and the importance of paramedical situations in relation to success or failure of programs of therapy and prevention."

Another type of program for demonstrating community health resources is found at the UNIVERSITY OF WISCONSIN:

> During two quarters of the 48-week fourth year, each student spends four weeks under the guidance of the department of preventive medicine and student health. Through the cooperation of the Madison City Board of Health, the State Board of Health and the Madison City Board of Education, students participate in several of the various departments in these agencies. They are usually divided into groups of two to four. All observe the work of the orthopedic, sight-saving, hearing aid and nutrition divisions, and observe the program for mentally handicapped children in remedial classes in the city schools.
>
> The student occasionally assists in the physical examination and tuberculin testing of Madison school children, works regularly in well-baby clinics, immunization clinics and a chest clinic. One student each week is assigned to perform the physical screening each morning and afternoon of children attending the Randall and University nursery schools.
>
> Each student makes visits to homes in Madison on the regular rounds of the city health department nurses and social workers. One student each week participates in the activities of the medical department of the Oscar Mayer Company of Madison, under the supervision of the medical director. In addition, arrangements have been made for individual senior students to accompany the State Board of Health epidemiologists, sanitary inspectors, sanitary engineers and industrial engineers at appropriate times, and occasionally to assist in epidemiological studies.

Criteria for Health Department Study—We reviewed a report of the American Public Health Association regarding the nature of assignments of students for limited training experience in public health departments, and agreed in principle with its recommendations. This report contends that training programs in public health agencies are unsatisfactory in achieving their purposes if: "nurses, sanitarians and other specialized personnel assume primary responsibilty for instruction; clinic activities in the health program take up most of the time; no specific plan is made and students are expected to derive understanding of the principles of public health practice by osmosis."[7]

The report stated that when students are assigned directly to the health officer, they are in a proper position to appreciate the role of the public health physician as the diagnostician of community health problems and manager of therapeutic regimes for community ills.

Projects for students should offer opportunities to study the epidemiology of a disease process, and to observe the building of a satisfactory program of control or prevention. By this method the use of ancillary personnel and facilities can be understood and their relationship to a specific objective realized. Also, this permits

the realization that the disease process is intimately tied in with the ecology of community life.

Field activities should be carefully explained, especially the basic philosophical reasons for the particular service.

Administrative responsibilities of the health officer should be indicated insofar as necessary to:

(a) Understand the process used in diagnosis and treatment of community health programs;

(b) Respect effective administration and recognize its problems and complexities.

The objectives of such a training experience are to promote a better understanding between physicians in public health practice and those in the clinical practice of medicine. Such an experience should make clear the relationships and obligations of the private practitioner and the official health agency, each to the other. It should broaden the outlook of the student so he will recognize that a disease process in an individual cannot etiologically be separated from the impact exerted on that individual by the complex of environmental forces.

Student "Internships" in Public Health—Student "internships" are available in limited numbers. These comprise supervised work experience outside of the regular medical school year and curriculum; they may be a valuable adjunct, supplemental to the regular teaching program. An internship is usually designed as an elective undertaking, providing an opportunity for added experience for students with particular interests in careers in preventive medicine and public health.

In New York State, for example, students are taken on by the state health department during the summer following their third year and assigned to work in a local health department, laboratory or public health research unit for as long as three months. This work is well supervised. It begins after a 10-day orientation period and ends in a 10-day conference for review of accomplishments.

The U. S. Public Health Service has a similar summer plan for students to participate in a great variety of its health service activities.

The conference favored such projects and recommended that every effort be made to make available many more such training experiences.

Community Health Resources Survey—A student, through study of community health resources, should have some understanding of the proper basis for determining the level of medical care in a defined community, whether in a small town or in a large city. This can be explained didactically; however, as an exercise in applying principles learned about the variety of community services which may be needed to provide preventive care for patients, a few schools give credit for surveys conducted by students of the health resources of a particular community. Such surveys are generally made during the summer vacation following the third

year, often in a community where the student is considering choosing as a place to go into practice.

This technique was first developed at HARVARD, where it functions as follows:

> Each student is asked to assume that he is a practicing physician. He is given carefully planned medical and social histories of four hypothetical patients, for whom he is to find in the community channels for complete care.
>
> He first prepares an outline of the optimal diagnostic, therapeutic and preventive services and facilities required for the management of each patient. Then, in the community of his choice, he collects information about the pertinent medical and social resources, which actually exist in that locality, from: (1) reference to publications about qualifications and number of physicians, classification and descriptions of hospitals, medical care plans, welfare agencies, etc.; and (2) personal interviews with physicians, hospital administrators, public health officials and other representatives of governmental and voluntary agencies in the health and welfare field. Finally, he writes a report discussing the differences between the services which would be optimally desirable and those which in fact, exist, and submits practical recommendations for change, if he feels change would be advantageous.

Occupational Medicine

The same principles outlined above naturally apply to teaching about the problems of occupational medicine. This deserves a special note, however, since many departments of preventive medicine have prime responsibility for instructing students in this field. At the same time, it should be pointed out that there was not unanimity of opinion at the conference regarding the amount of instruction in occupational medicine that should be offered to medical students. The primary basis of occupational or industrial medicine is a sound knowledge of the principles of medicine and preventive medicine. Undergraduate medical education should supply these, but the field of occupational medicine is a postgraduate specialty and should be taught as such.

None the less, it is apparent that in our heavily industrialized society, industrial health is an increasingly important facet of medicine. Although more and more medical departments are being created in industry, 60 per cent of the population still works in small plants without industrial physicians.[8] Students should know that this is no longer a field limited to the practice of traumatic surgery; the growth of the chemical industry, for example, has added a whole new range of problems to the field. Even more important, industrial medicine offers an opportunity for students to see preventive medicine in action. In industry preventive medicine has become a practical and working fact as management has learned that it pays dividends in less absenteeism, fewer compensation claims and more productive workers.

The nature of occupational diseases can be illustrated through conjoint teaching programs, didactic and clinical, with different aspects illuminated by repre-

sentatives from departments of preventive medicine, pharmacology, dermatology, surgery and radiology, for example.

Here again direct observation and training experiences in medical departments of industrial plants may be made far more rewarding than second-hand classroom familiarity with working conditions and health programs. Some departments of preventive medicine have worked out fairly extensive inplant sessions on industrial health. Likewise, some industrial plants are now offering opportunities for student internships.

The student should learn to give thought to the working conditions of patients, as well as conditions in their home environment, and should appreciate that the industrial physician is in reality a health officer for a segment of the population.

Factors Influencing Access to Health Services

Besides an understanding of the preventive measures available to individual physicians and organized community agencies, students should learn something of the problems involved in actually bringing known measures to bear on specific situations. They should appreciate that there are a number of important kinds of barriers which may keep people from receiving the services they need, and some of the ways by which it is thought that these barriers may be lowered. Some of these are the problems of payment for medical services and resources, the way these services are organized, and people's beliefs about medical care.

The first two subjects are often introduced by departments of preventive medicine in connection with study of community health resources. Discussion of people's attitudes toward medical care does not lend itself to didactic teaching, and can better come from meeting these attitudes as manifest in individuals and their families.

Medical Economics and Organization of Health Services—The economic aspects of medicine are of concern to all branches of medical science and could well be considered in the teaching of any department. However, since economic factors are particularly important as they affect access to preventive services, they are often considered as part of instruction by departments of preventive medicine.

Problems of payment for medical services can be approached from various angles: the financing of hospitals and other health agencies and how this affects the quality, number and distribution of these resources; the financing of personal health services from physicians, dentists and other health personnel, and how this in turn may affect the quality of service and the distribution of such personnel.

The historical approach is again useful in introducing students to these matters. Also, since many of these subjects are matters of debate, teaching may be conducted through guest lecturers discussing particular topics from various points of view, such as the provisions of the Social Security Act which affect payment for health departments, personal health services for the indigent, and special groups of physically disabled people; federal and state provisions for hospital construc-

tion, and rehabilitation services; voluntary health insurance; compulsory health insurance; health programs sponsored by labor and management, and many others.

Field visits are sometimes made, as for example to the headquarters of the Blue Cross-Blue Shield, which may introduce students not only to the way such organizations work, but to the philosophy which lies behind them. Similarly, medical economics comes into the discussion of services rendered by visiting nurses, health department clinics, rehabilitation agencies, medical departments of industrial plants and a variety of other resources for health service. And again, socio-economic barriers to good medical care are more poignant when seen through the eyes of patients and people rather than across the lecture platform.

Health services can be discussed from other vantage points. In any sizable community there is an abundant variety of health agencies and organizations; a recent study of Monongalia County, West Virginia, for example, revealed that there were 640 agencies involved in organized health service in this one area.[1] How does the physician intelligently use these resources to help a particular patient or family? In the hospital he can refer the problem to the social service department—but what does he do as a practicing physician? Again, what are the advantages and disadvantages of group versus individual practice, from the standpoint of both physician and patient? Guest lecturers, instruction from social service and seminar discussions are useful ways to bring students' attention to these matters.

Attitudes of Patients—Social scientists, as consultants in teaching, may make a real contribution in showing students how a patient's decision whether or not to seek medical care or to follow doctors' instructions may be influenced by factors in this patient's ethnic background or cultural surroundings.

Illustrating the differing attitudes found in particular groups which may affect access to medical care, Dr. Leo Simmons made the following remarks: "A German woman was advised that she had to enter the hospital immediately, otherwise there was great danger to her life. She left by the back door—it was sometime later discovered that she actually decided that she would rather die than be admitted to the hospital and be undressed—because her feet were dirty!"

It was agreed that social scientists can do much to stimulate the thinking of students along these lines and, together with psychiatrists, help to indicate the complexity of the attitudes of individual patients about medical care. As indicated earlier, these problems may be illustrated in connection with student experience in home care programs of various sorts.

What the patient and society in general expects of the physician, as an individual and also as a member of his profession, also should be considered.*

Ways of inducing patients to seek health services routinely and early may

* An interesting discussion of this subject may be found in "Psychiatry and Medical Education," pp. 124–130. (See reference No. 3.)

be discussed, both from the point of view of formal health education campaigns for official and voluntary agencies, and the part physicians can play.

IV. Conclusions

We believe that through systematic study of health, the natural history of disease, the social and environmental aspects of medicine and the use of the scientific method of biostatistics, teaching in preventive medicine can contribute to the total program of a medical school in its efforts to realize some of the principal objectives of medical education, as formulated in the A.A.M.C. statement quoted previously, namely: "... to provide a setting in which the student can learn fundamental principles applicable to the whole body of medical knowledge and establish habits of reasoned and critical judgment of evidence and experience. . . ."

In relation to the more detailed objectives of this statement, teaching in preventive medicine can help the student to acquire requisite knowledge: "of the normal development, structure and function of the human being; of the manner in which physical, chemical and biological agents, as well as hereditary factors, psychological factors, living habits and social forces affect the human being favorably or unfavorably; of the general techniques and resources available to the individual and the community for the prevention of disease and the maintenance of health; of the social and cultural settings in which medical education and practice are carried on."

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Chapter V

Applications in Clinical Teaching

IN OUR CURRICULUM in preventive medicine there is a real need to take teaching beyond theoretical instruction in the presentation of facts and techniques into the clinical area where we can deal with actual persons. Unfortunately, our subject has often been presented for the most part by precept, lectures and exercises, and has not been closely identified with patients themselves—the chief focus of attention for those who are preparing themselves for a medical career. This situation, however, is rapidly changing.

Preventive Aspects of Clinical Teaching

It is true, of course, that many elements of the practice of preventive medicine are found in virtually all clinical instruction today. Departments of medicine in some schools, besides teaching specific preventive techniques, have taken the lead in directing students' attention to the social and environmental as well as psychological factors that must be weighed in determining the origins of illness and prescribing an appropriate course of action.

Prevention figures importantly in surgical departments as well. A statement prepared for our conference by Dr. I. S. Ravdin of the University of Pennsylvania on aspects of preventive medicine which may be taught to advantage in a department of surgery illustrates this very well:

> The surgeon is greatly interested not only in treating disease by manipulative or operative methods, but also in the prevention of diseases commonly treated by such methods, and in the rehabilitation of patients with these diseases. The following categories come to mind in considering the teaching of preventive medicine from the point of view of surgery:
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> *The Discovery and Eradication of Pre-Malignant Lesions.* Now that almost all operations can be done with a very low morbidity and mortality rate, the eradication of certain pre-malignant lesions by surgery has greatly increased. . . . The surgeon is greatly interested in the diagnosis of these pre-malignant lesions. He has advocated routine proctoscopic examinations for certain age groups, the teaching of self-examination of the breast every two months, etc.
>
> *Surgery of Congenital Deformities Before They Have Produced Overt Disease.* In the last few years many operations have been done for patent ductus arteriosis, coarctation of the aorta and other congenital deformities before these deformities have produced overt disease. By their early correction, it is known that serious disease can be prevented and the patient's life expectancy greatly lengthened.

The Prevention of Trauma. Because surgeons are greatly interested in trauma, their knowledge should be of value in training soldiers, industrial workers, and the elderly in the prevention of accidents. Since they recognize what kind of strains and falls produce certain types of accidents, the teaching of this information would be helpful in industry and in the armed services. . . .

Surgical Research Helpful in the Prevention of Surgical Disease. A great deal of research in departments of surgery is directed not so much towards development of new techniques of surgery, but in the broad aspects of surgical disease having to do with prevention as much as with treatment. For example, much of the research in carcinoma of the breast done in mice has been done in surgical departments. . . . In surgical research, just as much attention should be paid to the prevention of surgical disease as to its treatment, and the final purpose of the surgeon should be that of removing the need for his services.

The Prevention of Fear of Hospitals and Physicians by Skillful Handling During Operation. The surgeon has a rich opportunity to promote the good will and trust of the patients on whom he operates. Many patients develop a distrust and fear of physicians if mistreated during an operation. This is especially true in operations on infants and children. . . . The surgeon who takes time to explain operative procedures to his patients and to gain his patients' confidence, will perform a great service in spreading good will for medicine in general. In this manner, patients can be persuaded to cooperate in preventive medicine plans.

The departments of pediatrics, obstetrics and psychiatry are in a large measure concerned with the conservation and maintenance of health, since they are primarily interested in the enhancement of the processes of growth and development. Many departments of pediatrics, for example, in their emphasis on child health supervision have advanced far towards the goals of preventive care and teaching. As someone stated: "The pediatrician's efforts have long since ceased to be curative only. . . . He assists in the instruction of the mother both before and after the birth of the baby. His function is to keep the baby well and to promote its growth, to examine it at frequent intervals and to advise the mother at every stage from its infancy to its adolescence."

As in the few examples given above, similarly in almost every field of medicine, preventive measures are assuming an increasingly larger proportion of the total activity.

Many departments of pediatrics and departments of psychiatry share with preventive medicine the belief that the student must be helped to relate the patient to his environment by participation or observation in programs which take him beyond the wards and clinics of the hospital. At our conference a pediatrician stated: "The important problems of child health care are continual appraisal of physical health, attention to psychological factors, and awareness of differences in children and their cultural backgrounds. If these are our ends, we must get the student into the community. Teaching has to be by example, not by exhortation."

Similarly, the report of the 1951 Conference on Psychiatric Education, states:

"The application of home care services and long continued follow-up can demonstrate realistically many of the sociologic problems—such as poverty, delinquency, family strife—that contribute to illness, and can reveal the importance and value of utilizing ancillary facilities, such as social service, public health nursing service, the courts, etc. These conditions apply not only to disabling illness but also to the much more frequent instances of ambulatory partial disability."*

Thus, from many points of view, these fields ally themselves naturally to teaching many aspects of preventive medicine.

Contributions from a Department of Preventive Medicine

If it is granted that consideration of the interaction between the person and his environment should be an integral part of every clinical history and the management of each case, instructors from preventive medicine can help the student during his clinical training to learn to apply such considerations to individual patients.

After all, an essential to the practice of preventive medicine today is sound clinical knowledge and judgment, leading to recognition and accurate diagnosis. Beyond this is awareness of the natural history of disease which so importantly influences decisions regarding prevention and therapy. This principle applies to all medical disciplines and provides the basis for correlation and understanding.

To carry out this type of teaching successfully, it is advisable, if not essential, that one or more members of the department of preventive medicine should have a clinical appointment. Obviously, while this representative of preventive medicine cannot have detailed knowledge in all disciplines, it is essential that he have a working familiarity with the many specialties.

To illustrate the clinical approach in teaching preventive medicine, this chapter describes a number of plans now in operation at various schools. No one of these teaching plans in itself does the whole job of demonstrating truly comprehensive health care, nor should this be expected of them. However, the illustrations are chosen to suggest the variety of ways by which this end may be approached.

I. Types of Clinical Teaching Programs Where Preventive Medicine Participates

Teaching on Hospital Wards

The teaching of clinical epidemiology at the patient's bedside, as carried out at YALE, has been described in the previous chapter.

An instructor from preventive medicine may also take part in ward rounds with a small group of students, in association with a clinical instructor, a social worker or other professional personnel. This is done at a number of schools; at HARVARD it was described as follows:

> "During these rounds the usual history, physical examination, laboratory findings, diagnosis and therapeutic recommendations are supplemented by discussions

* See reference No. 3, p. 63.

of the social and preventive factors related to the patient's illness and to his care following his discharge from the hospital. During these teaching sessions, it has frequently been possible to identify preventive or social factors or the availability of certain community facilities of great importance for better medical care for the patient. This program has also been of great value in the training of residents and interns."

The ultimate objective is to introduce the preventive point of view into the discussion of each case on the ward.[1]

Case Study—Clinical Teaching Conference

Many schools use the case study method in teaching preventive medicine conjointly with other departments. Sometimes this involves appraisal only, sometimes the provision of care. An attempt is made to elicit from the history and other available sources all the information that can be obtained concerning the total problem of the patient. These factors are discussed and a plan of management derived. The student sees that he must carefully record social history and think through the problem in terms of a team approach in providing medical care.

This is one of the ways used to teach preventive medicine at the UNIVERSITY OF WASHINGTON, for example:

> During the third year, the medical student is assigned a home care case, and assumes full responsibility for the care of the patient under the supervision of the hospital extension staff, consisting of medical social workers, a public health nurse and two physicians. The student follows this case throughout the balance of the third year and through the fourth year.
>
> During this time he makes visits, usually weekly, depending upon the need, interviews the agencies that have had contact with the case, and does a thorough comprehensive social case study of the family. While the student is spending the three weeks on his public health externship in the senior year, the case write-up is completed and turned in. Selected cases are presented before the fourth-year class at a two-hour conjoint clinical conference.

The UNIVERSITY OF CALIFORNIA MEDICAL SCHOOL uses a short case study:

> Here, senior medical students have service in medicine for 12 weeks, during which time they spend part of every day in the outpatient department and another part of the day on the medical wards. During this period each student is assigned one case which he had already worked up in the outpatient department for one or two follow-up visits at home. The contact with the family in the home is, therefore, the result of a prior contact with the sick individual.
>
> After the student has visited the home for the first time, a medical social worker goes to the same home and makes her own study. Subsequently, the student independently evaluates the varied aspects of the case, considering pertinent factors as they relate to the individual patient, to home surroundings and to other members of the family. He writes up the case study and presents it to the class in medicine. The medical social worker, a psychiatrist and a representative of preventive medicine contribute to the discussion that follows.

A family medical care program, limited so far as student participation is concerned to the diagnostic stage of care, is the central theme of a fourth-year clerkship in community health at the STATE UNIVERSITY COLLEGE OF MEDICINE AT NEW YORK CITY:

> Families are selected from its clientele by the nursing service of the health department and each student is introduced to the family in its home by a public health nurse. The student is expected to conduct a complete examination of the health status and needs of each individual in the family. He attempts to interpret the relevant personal, social, biological and environmental factors, and considers the rehabilitative and preventive measures needed and the appropriate resources in the community that may be of assistance. The student is supervised by an internist, a psychiatrist, social worker and sociologist. The advice of other consultants is available on request. Treatment is arranged in a conference of the student, social worker and public health nurse through referral to the adjacent agencies for medical care, usually other clinical units affiliated with the medical college.
>
> Entire families only are studied, with few exceptions. "The attempt is to have the student see the family as a unit having functions that relate to personal and social well-being—whose activities commonly are responses to these functions, and whose adaptation is modified by the use of culturally derived techniques, and that these bear on health."
>
> This teaching mechanism provides the student with experience in family study and care without involving the institution in the responsibility of a day-to-day domiciliary medical care program. The role of the student and of the school in entering lives of entire families is "diagnostic," i.e., it is a device to initiate medical care under auspices provided by the community. Acute intercurrent illness is treated elsewhere and only observed by the student. The opportunity for practice in definitive treatment of such illness and continuity of observation is sacrificed to avoid the possibility of giving excessive responsibility to students when they are allowed to function in extramural circumstances.

Outpatient Department Clerkships

Outpatient departments of large hospitals should provide a favorable setting for the teaching of preventive medicine, since they serve patients who, outside of clinic hours, may be actively engaged in their usual occupations and way of life. In many medical centers today, however, outpatient services are poorly organized to foster such teaching. They are so diffuse that it is difficult to correlate activities. They are for the most part staffed with part-time physicians with no continuing responsibility for their organization and conduct. Usually, they are designed primarily to consider important or urgent problems of the largest possible number of people in the shortest possible time. There is little contact with community services—or even with other hospital services. Students rotate rapidly between various specialty clinics and rarely see the same patient twice.

However, in a number of institutions, programs are evolving in which the department of preventive medicine is cooperating with other clinical departments

in an effort to give an integrated type of teaching, something which more nearly represents a comprehensive type of medical care.

By fitting preventive practices and considerations into outpatient care the student may be offered a very practical approach, and learn techniques which will be of value to him in his own later practice. Such a program, the coordinated clinic clerkship, has been developed at WASHINGTON UNIVERSITY, where the department of preventive medicine functions as an integrating agency:

Objectives and Administration. A coordinated clerkship of 12 weeks for senior students is organized under a committee composed of faculty representatives from five participating departments. The head of the department of preventive medicine serves as chairman.

In this program, which started in 1952, the outpatient clinical teaching of the departments of medicine, surgery, psychiatry, neurology, obstetrics and gynecology, ophthalmology, otolaryngology, dermatology and preventive medicine takes place concurrently, giving the medical student the opportunity to follow patients for longer periods of time and in a number of different clinics.

The program does not include student experience in a pediatric clinic, an emergency service or a home medical service. Activities may be extended into these areas in the future.

Teaching Program. The department of preventive medicine directs students' attention to the comprehensive aspects of medical care, emphasizing the environmental, social, and economic aspects of illness.

Teaching activities include *weekly seminars* in which the problems of individual patients are discussed. Into these discussions are woven information concerning the preventive aspects of disease and the role of community agencies and public health departments in meeting the problems of illness. Seminars are attended by 14 students, several instructors, and one or more medical social workers as well as guest participants.

Another teaching activity centers in *student-instructor interviews* where the experience of the student with his patients is discussed and analyzed. For this purpose the student maintains a record of the pertinent medical and social information on each patient seen. These records and interviews provide the mechanisms for selection of cases for presentation in seminars.

Each student's weekly program includes one free afternoon which may be used for home visits, visits to community agencies, reviewing of case records, interviews with relatives of patients, writing to referring physicians, or for any other activity which will stimulate his interest and add to his information concerning his patients.

The program is too new to permit significant conclusions. However, student opinion and faculty reaction have been uniformly favorable. One problem has been posed, however. The students indicate in a variety of ways that they are inadequately prepared for this more intensive experience with the problems of ambulatory care. Obviously they feel more at home with the problems of fully manifest or exotic disease as seen on the wards than with the early disease or functional illness of clinic patients. It is likely that observation of students under the conditions of the coordinated clinic clerkship will indicate a variety of changes in earlier

phases of the curriculum which would better prepare them for this type of experience.

From the standpoint of the department of preventive medicine, the new program offers a more vital approach in teaching than the partially improvised approach utilized formerly in a clerkship which depended largely on socio-medical case studies. Now the student deals directly and intimately with social, environmental, economic and community problems as he concurrently participates in provision of medical care.

The program offers the further advantage of permitting a significant development in curriculum within the established services of a medical center. It gives purpose and impetus to realignment and reorganization of outpatient services so that integrated and comprehensive medical care may be more readily provided. On this improved basis other developments in curriculum and the establishment of new services perhaps may be more readily achieved.

At CORNELL MEDICAL COLLEGE, a program for comprehensive care and teaching has been recently established, also using the outpatient department as a nucleus. Here the department of internal medicine provided primary administrative leadership in the program. Dr. David P. Barr described the program at Cornell as follows:*

"A salaried full-time staff of especially interested representatives of the departments of medicine and pediatrics forms a nucleus for the organization of the enterprise, and for the correlation of its various functions. The department of preventive medicine focuses all of its fourth-year teaching in the clinic. Salaried consultants on a part-time basis represent the departments of psychiatry, surgery and gynecology. A social service worker and a visiting nurse devote their entire attention to the venture.

"Facilities for diagnosis and treatment are more than sufficient. Contacts with social agencies in the community are close and only await development. Admissions to the clinic are strictly regulated to the requirements of teaching. Most important of all, the curriculum of the medical college has been rearranged. Without interruption or significant curtailment of any previous teaching, a continuum of 22½ weeks in medicine, pediatrics, psychiatry and preventive medicine has been provided for each senior medical student. The enterprise is not directed by any one department but is operated by a committee representative of the educational, clinical and administrative interests of the medical center.

"With such an organization, the attainment of several objectives is sought. Especially it is hoped that by means of the continuum each student will have opportunity to follow his patients long enough to permit thorough acquaintance not only with their strictly medical problems but also with their environmental, home and family conditions.

"It is hoped that he may consider not only curative but also preventive aspects and may relate and evaluate physical and emotional components of disease, that he may cease to regard his patients as primarily medical, surgical or psychiatric

* See reference No. 1, p. 26.

problems but may instead think of them as men, women and children facing a particular and often distressing life situation. Above all, it is hoped that the previous teaching of diagnosis and curative medicine and of physiological science may never be stultified by the program but on the contrary may be enriched and illuminated by a broader and a deeper understanding."

From the beginning of the program a serious and intensive effort to evaluate its effect on the medical students has been in progress. The Bureau of Applied Social Research of Columbia University has supplied necessary technical skill and professional advice in assessing student attitudes and changes in them which may be attributed to a more comprehensive approach to medical care.

The UNIVERSITY OF TENNESSEE has established a family general practice clinic within the outpatient department. Since this school serves an area which particularly needs general practitioners, the clinic's primary objective is to attract students to this type of practice:

> The family general practice clinic is the only clinic in the outpatient department where an entire family may be served, instead of being split by referral to various departments. It is under the administrative direction of the department of preventive medicine.
>
> The admitting office sends every fifth patient here; thus, the patients are a representative sample of the clinic population. Its equipment makes it a more or less self-contained unit within the outpatient department, with its own x-ray, minor surgery, laboratory and physiotherapy equipment.
>
> The director of the clinic has a background in general practice and the visiting staff consists of general practitioners. There are no specialists on its staff, but patients may be referred to specialty clinics of the outpatient department. Students are assigned here during their last five months of training. Since by this time they have had experience in the various specialty clinics, the family general practice clinic presents opportunities for applying specialized knowledge from different fields to the total needs of patients and their families. A medical social worker assists the student in understanding and meeting these needs.

Domiciliary Medical Services

The department of preventive medicine may take part in programs which provide medical care in the homes of patients, or may take responsibility for directing them. Such programs, as has been noted, may offer a very desirable setting for teaching many aspects of preventive medicine.

One example of a domiciliary program is the home medical service at the BOSTON UNIVERSITY SCHOOL OF MEDICINE:

> *Administration:* The department of preventive medicine at Boston University has clinical and administrative responsibility for the provision of medical care in the homes of indigent and medically indigent, acutely and chronically ill patients, living within a specifically designated square mile area surrounding the medical school. This is a slum area containing a population of about 50,000. Approximately 15,000 home visits are made to 5,000 patients annually. This service operates from

the outpatient department of the Massachusetts Memorial Hospital. The professor of preventive medicine is director of the outpatient and home medical service of the hospital.

How the Service Operates: Fourth-year students rotate through this service for one month in groups of four to six. Calls for home medical care are screened in the home medical service office from 8 A.M. to 3 P.M. daily. Students make the initial visit to the home, make such diagnostic investigations as are necessary and institute preliminary treatment. They are responsible for the care of the patient under the supervision of the resident. All students return to the hospital at 3 P.M. and meet with residents on the home medical service who in turn go out with the students, check patients seen that day and institute definitive treatment. The student, under supervision of the resident, is responsible for follow-up.

Daily, except Sundays and holidays, an instructor in the department of preventive medicine meets with the students and residents to review all patients seen the previous day. Problems of differential diagnosis, patient management and specific treatment are discussed in the light of the social and environmental circumstances in which the patient is seen. Referral to social service and/or the Visiting Nurse Association may be made at this time. Special services for patient care are available on consultation basis from all services in the hospital.

Indoctrination Conferences: During the initial week on this assignment, students have a series of indoctrination conferences. The scope and aims of the home medical service are discussed on the first day. On the second day, a psychosomatic conference is held to discuss evaluation, approach to and management of emotional problems. The conference on the third day concerns basic home nursing techniques. On the fourth day, the position of the social worker in relation to medical care is presented, in addition to an elaboration of the availability of community resources and the manner in which they may be used for patient care. The fifth conference deals with the Visiting Nurse Association and the extent to which bedside care is made available. Thereafter, only two conferences are continued weekly, the psychosomatic conference and the medical-social conference. These are attended by students on the home medical service, the medical social worker, students of social work, representatives of the Visiting Nurse Association and student nurses from Massachusetts Memorial Hospital.

Records and Facilities: Home medical service records are maintained in a separate file and notes are entered chronologically by fourth-year students and residents. Laboratory facilities for routine studies are available. Such portable diagnostic equipment as is practical is maintained for regular daily use, including an electrocardiograph machine, vital capacity apparatus, scales, etc.

Continuity of Care: Some degree of continuity of patient care is maintained by the assignment of home medical service residents to the medical clinic in the outpatient department, where they can follow patients referred to this clinic. Patients who are hospitalized are followed by the referring student and reported on periodically through the month.

Junior personnel at all levels are trained together—the student nurse, medical students, house officers and student social workers. The representatives of these professional fields work together in selected problems of the home medical service,

and it is believed that their association in the teamwork approach to problems is an essential feature at this beginning stage of their professional education.[2]

Still another example of a home care medical program is at Richmond, where a health department service program is conducted in cooperation with the MEDICAL COLLEGE OF VIRGINIA:

The Richmond health department home care program provides comprehensive care for acute and chronic illness and dental care. The goal of this program is to insure good medical care to the indigent and the medically indigent residents of the city, affording them a complete continuity of service in the home, hospital, clinic and rehabilitation center. At the same time, the home care program provides a method of teaching medical students the family and social aspects of general practice.

How the Program Operates: The Medical College of Virginia assigns its senior medical students to the program. These students spend eight weeks on the medical service and specialties in the outpatient department. During this time, they are divided into thirds, so that one-third are assigned to the home care program and the other two-thirds to the medical clinic from 9 A.M.–12 A.M., and the medical specialty clinics from 2 P.M.–4 P.M. daily except Saturday and Sunday.

The home care group is on duty at all times so that each senior spends from 18 to 20 days in this program. During the period of eight weeks, all students attend two seminars weekly for one hour each; in these, public health and aspects of care other than strictly medical are discussed on the basis of the presentation of patients and families currently under observation in the program. These presentations are made by the student who is actually following the case at the time.

The students make home calls under the supervision of three second-year residents and four members of the faculty from the department of medicine.* A fifth member of the faculty, from the department of pediatrics, serves as a consultant.

Review of Experience: Initial home calls are made by the students in pairs. The findings are then reviewed with the residents and/or the attending physicians who return with the students to see the patient, or otherwise dispose of the case as seems best by referral to the outpatient department, emergency rooms or hospitals. Periodic visits to chronic cases are made by students, residents, attending physicians or combinations of these groups. A meeting of all personnel for review of problems and discussion of cases is held weekly. These conferences are also attended by representatives of the various nursing and social services.

House Staff Participation: The house staff participating in the program at any one time consists of two second-year men (junior assistant residents) from the medical service, and one man in the second year of the two-year general practice internship. For purposes of administration, this man is also carried by the hospital as a junior assistant resident, since the second year of the general practice rotation is almost entirely in medicine. The resident staff from all special fields, although not officially connected with the program, cooperate freely in seeing patients in the home or helping in consultation.

* The students use health department cars equipped with two-way radios which enable them to call in for information and to receive calls for other patients in nearby areas.

Outpatient care is provided in the outpatient department of the Medical College of Virginia Hospital, where a wide range of specialist and laboratory services is available. The admitting clinic is staffed by senior medical students and residents as part of their training under the home care program.

Budget: The total budget for this program amounts to $82,501 in direct services for the coming year, of which amount the city puts up 80 per cent and the medical college 20 per cent. The total budget for the general medical care services is $350,174 for the year 1952–53.

Family Care Programs

The home care programs just described give students a supervised extramural experience which sharpens their appreciation of the effects of people's way of living on their health, and gives them practice in working closely with a variety of professional personnel. Such programs, however, are not primarily designed to provide or demonstrate continuity of patient care. This principle is emphasized in programs which provide health and medical care for selected family groups over a continuous period of time. Here the student sees individuals of all ages, whether healthy or sick. He gets to know the health needs of a whole family, to appreciate the effect of the family situation on the individual's health, to mature in the patient-physician relationship, to see ways to apply early preventive measures for presumably well members of a family, to learn the difficulties of providing care for the chronically ill, and the importance of rehabilitation.

The program at the UNIVERSITY OF PENNSYLVANIA known as the family health advisory service has already been described in Chapter IV. Students here act as health advisors to particular families at home and in the hospital for the four years of their medical training. The emphasis is upon a gradual increase in student responsibility in meeting the problems which they encounter from month to month and from year to year, in contrast to the more concentrated experience of the domiciliary medical care programs. At CORNELL MEDICAL COLLEGE, third-year students may elect a similar program offering a continuing contact with a patient and his family over a span of two years or may elect a short-term family health advisor experience of six weeks.[3]

Other examples of programs where the student's attention is directed to a particular family or families are to be found at Boston University and at the University of Tennessee.

At BOSTON UNIVERSITY a family care program operates within the framework of the home medical service described above, and functions as follows:

Objectives and General Plan: This project was designed to give third-year students an opportunity to observe and manage chronic illness in the home over an extended period of time, study problems of family inter-relationships as affected by illness, institute such measures of preventive nature that are possible and desirable and develop the use of community resources when indicated.

Departments integrated in this program are medicine, psychiatry, pediatrics, social service and preventive medicine.

At the beginning of the third year, the purposes and objectives of this program are presented to the entire class. A patient with a chronic illness is assigned to each member of the class, to be followed in the home for nine months. These patients are selected from the patient load of the home medical service. Insofar as possible, they are chosen from families where there are several young children who will require immunization and general health supervision. The student makes an average of 15 home visits to his family.

Teaching Program: Two part-time physicians serve as preceptors to the students. These physicians supervise the care of patients and meet with the third-year students individually. It is intended that the clinical, social and environmental problems in medical care be an educational responsibility of the preceptors. The students also have regular scheduled meetings with a psychiatrist who is a member of the department of preventive medicine. His instruction deals mainly with the problems of the approach to the patient, patient-doctor and inter-family relationships, and the management of emotional problems and maladjustments.[4]

Students are required to maintain careful records and submit complete reports on their patients. Subsequently, as an exercise in the course in preventive medicine, reports on selected patients from this source form the basis for a panel discussion for the entire third-year class.

In connection with the family general practice clinic at the UNIVERSITY OF TENNESSEE described above, a family care program was also established:

Feeling the need of students for some type of home care experience, a family care program was set up under the joint auspices of the division of medicine and the division of preventive medicine.

A patient is selected who has been studied by the student in the medicine outpatient department. The student then serves as family physician to this patient's entire family for one year. Preferably this family includes two or more children and a patient suffering from a chronic disease. The student makes home calls in the event of illness, and either provides medical care or makes arrangements for care. The family general practice clinic serves as the office for ambulatory care and is open until midnight daily.

The student is expected to plan a program of comprehensive medical care for his family, to the extent that it can be provided with community resources. A medical social worker assists the student in the use of these resources.

General practitioners from the family general practice clinic serve as preceptors in this program, making home visits with the student upon request. In this way the student observes how an experienced general practitioner deals with illness in the home. All medical services provided by students are supervised by these general practitioners.

A requirement for graduation is the student's report of his family, including an evaluation of their social and economic background, their medical needs and the extent to which these have been met. Periodic conferences are held with students

to discuss their problems and services in relation to this program. Medicine, psychiatry, pediatrics and preventive medicine participate in family care conferences.

Preceptorship Programs

Preceptorships were discussed as another useful mechanism for contributing to a student's understanding of health services. How such programs relate to training in the preventive aspects of health care depends, of course, on the individual preceptor. It is generally recognized that a hazard in such programs is that the student may be assigned only routine chores by his preceptor, and not derive a real educational experience. Methods of selection of preceptors and supervision of programs, therefore, are all-important.

The following summary is based on information received from 17 of the 19 schools listed by the Council on Medical Education and Hospitals of the American Medical Association as having preceptorship programs:

Nature of Experience: In nine programs the student accompanies a general practitioner in his daily work and assists him if the physician so desires. The others variously provide experience such as in a group practice clinic, with a public health agency, in industrial hygiene or in a small community hospital. Half the programs are compulsory for the students, while the others are voluntary, and the duration of service varies from two weeks for three of the programs to three months for three others. The majority of the programs, 12, are scheduled during the senior year or the summer preceding the senior year. Twelve have been started during or since 1948.

*Methods of Supervision and Reinforcement of Learning Experience:** Five schools have a special faculty committee which supervises the program. Five send representatives to visit the preceptors at least once a year. Two provide mimeographed material to students and preceptors and a third school is preparing such material; two mentioned material for the preceptors only. Six schools arrange some type of meeting of preceptors on a regular basis. In five schools the students keep a daily log book which is turned in and graded; three of these also require one or more case reports. Informal individual conferences with students before or after the preceptorship are held at five schools, at another there is a meeting with both preceptor and preceptee together. When duplication is eliminated, a total of eight schools have some type of reporting, as described; an additional one stated, "We have reports from preceptors on students and from students on preceptors." Four schools which are included in the student reporting above also added that they request reports from preceptors.

The preceptorship program at the UNIVERSITY OF NEBRASKA COLLEGE OF MEDICINE was described as follows:

A 12-week period of preceptorship training has been added to the curriculum of the College of Medicine and is a requirement for graduation. A number of well-qualified, successful practitioners of medicine who have signified their willingness

* Many schools use several of the techniques given.

to participate in the teaching program are the basis of the preceptorship training. The activities of the preceptors are under the guidance of a preceptor committee of the college, formed of faculty members of the College of Medicine.

Physicians in rural communities are real leaders and carry definite responsibility in community work in addition to their daily practice. Too often students in a medical center see only the aspects of medical practice of specialties and subspecialties, and are not given a chance to see the broad aspects of general practice.

The preceptor method of teaching is an intimate and tutorial method of instruction. Each practitioner has his own method of eliciting a history, advising a patient concerning operative procedures, talking to the patient and his relatives in the event of serious illness, handling of emergencies, specialized operative techniques and his individual management of obstetrical cases. There is a real opportunity for the preceptor to demonstrate these aspects of practice to the student during his 12-week period.

There is also a unique opportunity for the student to observe the social and community responsibilities and the rewards of a practice in a smaller community.

Preceptors act as teachers, and they have been appointed to the extramural teaching staff of the faculty of the College of Medicine. Each preceptor is required to grade the student. Each student is asked to keep a diary or log containing the name of each patient seen, sex, age, diagnosis and a brief summary of the treatment given, with a note indicating the extent to which he personally participated in giving this treatment.

At WISCONSIN, which has a well-known and long-established preceptorship program, the fourth-year student is given several types of extramural experience, besides that noted in Chapter IV, designed to acquaint him with the conditions of both rural and urban medical practice. Besides spending 12 weeks with a carefully selected general practitioner and working along with him on home visits and in office and hospital practice, students also work for two weeks under direction of members of the staff at the South View Isolation Hospital in Milwaukee; four weeks in Chicago on an obstetrical service under the auspices of the Maternity Center and the Chicago Lying-in Hospital; two weeks in a tuberculosis sanatorium, and one week at a state hospital for the mentally ill.

Complete Medical Care for Certain Population Units

One opportunity not now available in most schools but deserving serious consideration is a coordinated program providing total medical care for a given population unit under the auspices of the faculty and a teaching hospital staff. Experiments with domiciliary care and family care, though seldom continuous and total, suggest that it is desirable to extend this teaching opportunity to involve broader groups of people.

Such a program would provide a continuing method of bringing people not yet ill or in very early stages of disease to the faculty and students. Furthermore, such a program would afford a laboratory for a variety of research activities in pre-

ventive medicine. Parallel research and teaching programs should strengthen each other.

Schools undertaking service programs of this type must weigh the demands of such service on their faculty members against the values realized from teaching and research activities. In general, schools will find it necessary to augment teaching staffs in order to launch such programs without detriment to the teaching in the rest of the curriculum.

Student health services are one frame of reference for such teaching. In some medical schools, the department of preventive medicine is also in charge of the student health service. Personnel from several departments of the medical school may work with the department of preventive medicine to provide varying degrees of service to students. For example, as part of the clerkship in preventive health services at the UNIVERSITY OF WISCONSIN, described in part in Chapter IV, students actively participate in the medical care and health advisory functions of the student health service, spending the equivalent of approximately one week full-time in the student clinic and one week full-time in the infirmary section. This service is operated by the department of preventive medicine, and provides comprehensive care for the current enrollment of approximately 14,000 university students. Here the medical student gets experience in dealing with people from a different background and age group from those he sees during the same period in the regular outpatient department and wards of the hospital.

The nature of the student population, and the possibilities for obtaining needed information from graduates over long periods of time make certain types of longitudinal studies feasible in connection with student health services. At Wisconsin, for example, the results of BCG vaccination of students in the medical school and the school of nursing have been accumulating over a period of several years.[5]

A student health service also lends itself to other types of studies requiring a large population base. On two occasions at Wisconsin, for example, large groups of students were screened for dermal sensitivity to tuberculin, histoplasmin and coccidioidin, and comparisons made with the individual chest x-ray taken at the same time. This was especially revealing with respect to the relation of pulmonary calcification and dermal sensitivity to the agents mentioned, particularly histoplasmin. The study was made in conjunction with the U. S. Public Health Service, which included several other universities in a program utilizing the same methods.[6]

At NEW YORK UNIVERSITY, a limited number of fourth-year students participate in a medical service plan offering comprehensive care to patients through group practice and voluntary insurance associated with the Health Insurance Plan of Greater New York. Under faculty supervision, students see patients in the medical group center, in the hospital and at home as part of an elective in general practice. Here, as in the other programs described in this section, teaching

is conducted in connection with patients from outside the ranks of the indigent population, where clinical experience has traditionally been confined.

Quite a different example of a program aimed to provide comprehensive care for a whole population unit is presently being developed in HUNTERDON COUNTY, a rural county in New Jersey. Here, in an area previously without a hospital, a medical center has been built through energetic community initiative and a program designed which will go well beyond the usual limits of the community hospital. The plan is aimed at a smooth coordination of community and private medical and health care at a high level of performance.

The building is to be a medical center in a very broad sense, providing whatever physical facilities the county needs (in addition to doctors' offices) for the prevention and cure of disease, and also serving as a nucleus for county-wide health services. It will also be used for teaching in a number of different ways, only a few of which are suggested here:

> The services given at the center and radiating from it will be provided in part by family physicians in private practice throughout the county; in part by specialists and residents appointed jointly by the center and the New York University-Bellevue Medical Center; and in part by full-time employees of the community who will exercise hospital and health center functions under unified leadership.
>
> All general practitioners in good standing will have staff privileges in the center. Salaried specialists, working only in the center, will serve in a consultant and teamwork relationship with the general physicians when needed and will be responsible for supervising the training of residents and interns assigned to the center from New York University-Bellevue Medical Center. Medical students from three different schools—New York University, the University of Pennsylvania and the State University at New York City—will be assigned for varying periods to the center, where they will work with both general practitioners and specialists. Here they will have an unusual opportunity to participate in many, and observe all facets of a far-reaching community medical program which includes not only inpatient care but a diagnostic center, general practice residency, periodic multiple screening, panel discussions in health education of parents and lay groups of many types, and a mental health program centering around a team of psychiatrist, pediatrician, social worker, public health nurse and psychologist serving as a continuous focus of inservice training for other health personnel in the area.
>
> The specialists all must qualify for faculty appointments at New York University-Bellevue Medical Center, and are continuously available to students and house staff in the center, as well as committed to facilitating the efforts of the rural physicians working in the center.

Participation by Interns and Residents

The use of intern and residency experience for orientation to community health problems was considered very briefly. One of the stumbling blocks in training medical students to a comprehensive view of health services is that much of

their instruction is given by interns and residents experienced on hospital wards but without any experience in practice outside of institutions. In many of the teaching programs described above, however, the house-officer staff of teaching hospitals is closely involved. This, of course, is true where representatives of preventive medicine and social service take part in ward rounds. In the home care programs at the Medical College of Virginia and at Boston University, as has been described, students have clinical reviews with residents, and this staff participates in the home care program. This is also true at Cornell in connection with its comprehensive care and teaching program.

One obstacle to such participation may be the requirements of the specialty boards for qualifications which put blinders on a broader program. This has been resolved in some instances by getting approval from a chairman of the specialty board for application of the interns' and residents' time devoted to participation in such programs.

A somewhat unexpected influence is being brought to bear upon interns and residents as a result of family health advisor programs: frequently when a member of the family which has been followed by the student is admitted to the hospital, the student is in a position to use his intimate knowledge of the family to call attention to factors in the home having a direct bearing upon the illness. The tables are turned: student is teacher and intern is student.

II. Some Practical Approaches

There are, of course, many real problems posed by the development of these newer programs. First, what is being sought must be exactly determined, whether a change in the content of knowledge or a change in attitude. The need for defined purpose is clear.

A correct balance between service aspects of such programs and teaching requirements must be established. As has been previously noted, the usual experience of students in clinics is often of limited value because outpatient departments are too directly geared to service, often to the detriment of teaching. We recognize that there may be similar dangers in programs where students participate in the provision of medical care to patients in their homes, and believe that if the community is to serve as a teaching laboratory such dangers must be avoided.

Similarly, research in preventive medicine, when the community is used as a laboratory, is often closely inter-related with the administrative and service functions of voluntary and official community agencies. Careful planning is required to establish a study which meets the criteria of the scientific method and avoids biases introduced by administrative or service procedures themselves.

Finally, the teaching methods and the amount of personnel required for successful operation of such programs must be carefully explored and the problem of time allocation faced.

Our conference did not attempt to formulate detailed answers to these important questions, but rather suggested a number of general approaches.

Dr. David P. Barr, for example, in describing the program at CORNELL, listed several prerequisites for the effective teaching of comprehensive care in outpatient departments as follows:*

1. The most crucial requirement is a group of influential clinical teachers representing several, if not all, of the departments engaged in the teaching of third- and fourth-year medical students.
2. Facilities which encompass all of the needs for diagnosis and treatment must be available.
3. There must be close relationship between the outpatient department and the social agencies in the community.
4. Admission policy to the outpatient department must be so regulated as to supply a sufficient number of patients without overcrowding.
5. The teaching programs of several of the clinical departments must be closely and constantly correlated. This need would apply with special urgency to the departments of medicine, pediatrics, psychiatry and preventive medicine.
6. The curriculum of the school must be so arranged as to permit each student to attend the same patients over relatively long periods of time.
7. There must be a staff which can devote itself without interruption to the organization, correlation and operation of the service and teaching.

Many of these same requirements, of course, apply equally to other types of programs designed to demonstrate comprehensive health care, whether clinical teaching conferences, family care programs or whatever.

Sufficient personnel, both full-time and part-time, must be available to provide proper direction and supervision of the student and to develop the program to a high level of medical care. It would appear that one or more full-time individuals are essential to the organization and administration of any comprehensive health care program. Part-time personnel in all clinical departments should, by assignment as preceptors to students, demonstrate practices of good community medicine.

As has been seen in most of the illustrations given throughout this report, in addition to the staff of the department of preventive medicine, the teaching services of various clinicians are required. In certain circumstances, as described in Chapter IV, participation of staff members from the basic science departments is useful in rounding out the program. Representatives of medical social work are an essential adjunct. Consultation with representatives of the field of the social sciences is desirable to aid in the student's general orientation and to aid in interpretation of his experiences. The contributions of other members of the health team are

* See reference No. 1, p. 26.

vital to the student's understanding of the programs with which he has contact. These include health officers, public health nurses, health educators and others.

With the variety of types of programs here described, no standards are feasible or desirable regarding the amount of teaching personnel required. While it has been fairly well established that in outpatient departments the optimal ratio of instructors to students is about 1:1, instructor-student ratios for extramural instruction have not been developed. A study is now being conducted by a committee of the Commission of Chronic Illness concerning the time and cost involved in 12 such programs.

The sheer variety of existing programs contributing to the teaching of comprehensive medical care also makes evaluation difficult. However, a number of points were listed for consideration as criteria.

In examining the *general characteristics of the service program*, the following points should be considered:

1. To what degree do all major departments participate?
2. How does the status and prestige of the participants in the program compare to participants in other established medical school activities?
3. Completeness.
   a. Are all branches of medical services included?
   b. What types of service are given? (domiciliary, ambulatory, hospitals, nursing homes, rehabilitation centers, etc.)
   c. What ancillary services, such as social service, public health nursing, are included?
   d. What is the extent of health maintenance service, such as well-child supervision, periodic health examinations?
   e. What is the degree of availability to patients, initially and as needed for follow-up?
4. Is there responsibility for continuity and integration of service to the patient?
5. What is the degree of attention to the interpersonal relations of the patient?
6. Is financial support adequate to maintain the program?
7. Does the plan serve patients in a defined geographic area?

In examining the *teaching values* of such programs, the following are suggested as basic considerations:

1. Is the patient load representative as to types of problems to be encountered in practice?
2. Is there effective supervision of student experience in the physical, emotional and social aspects of the patient's problems?
3. How frequently are seminars and case conferences conducted?
4. Does the student receive adequate orientation regarding community resources?

5. What degree of responsibility is the student given?
6. What is the length of time and continuity of student service?
7. What is the extent of sustained responsibility for the patient's welfare, even though referral to other consultants or services is necessary?
8. Does the program provide opportunity for teamwork with other professional personnel, medical and nonmedical?

Finally, the research attitude of program leaders should be noted:

1. How is effectiveness of the program in teaching students measured?
2. Is the program being conducted in connection with a research program, basic or applied?

Leadership in introducing teaching programs in comprehensive care has been taken by various departments in different medical schools. Departments of medicine, pediatrics and psychiatry, as well as preventive medicine, have pioneered, usually in cooperative ventures. Under whatever arrangements, development of such programs calls for administrative understanding and wholehearted support throughout the medical school, just as effective teaching in them requires interested and skillful teachers who can work well together. Where these teaching programs are organized to demonstrate continuity of patient care in the hospital and at home and use community health resources, understanding and support are likewise required in the university, the hospital, the outpatient department and community agencies.

A department of preventive medicine is well equipped to take an active part in the development of such programs since it has skills in integration through its frequent activities in coordinating facilities and personnel and since it usually serves as liaison between the medical school and organized community health activities. The department's function may be that of leadership and full administrative responsibility; cooperation with other leadership in development and administration; or stimulation of faculty awareness and interest. The teaching programs which have been described show how departments of preventive medicine have assumed different degrees of leadership in different schools.

But wherever the impetus originates for undertaking a home care plan, or any other program designed to teach comprehensive care, the planning of such a program requires the participation of:

1. Clinicians who are thoroughly familiar with modern medical practice.
2. Faculty members from various departments who understand the structure of society and community organization as it affects health care.
3. Individuals who have a knowledge of the principles of administration, including the organization of personnel, facilities and services that provide health care.
4. Individuals who have a knowledge of the quantitative approach to group phenomena of health and disease.

III. Conclusions

Through participation in clinical teaching in programs designed to demonstrate comprehensive health care, a department of preventive medicine can strengthen the realization of the over-all objectives of medical education as it helps the student to attain basic skills: "In eliciting an accurate and adequate history; in the use of assembled data to provide a valid diagnostic appraisal and an effective course of action, calling upon additional specialists' services and community services as needed; in winning and holding the confidence of patients and their families; in working in the medical team of physicians, nurses, social workers, physical therapists and others; in working in the community team of official and voluntary institutions and agencies providing health services."

Further, experience in such programs helps the student gain an understanding of the professional and ethical principle: "Of being willing to accept the responsibility for the initiation and continuing coordination of all of the efforts directed toward the patient's problem or problems as they relate to his health."

The need for continuing appraisal of these new programs was emphasized. As one member said: "We need to develop further experiments in comprehensive medical care, we need to study them, to evaluate them, to do research on them, so that in five years, when perhaps we will meet again, we may have much more factual knowledge around which to center our discussions."

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Chapter VI

The Medical School and Community Setting

PREVIOUS CHAPTERS of this report have reviewed the goals and opportunities of preventive medicine in teaching and research. Recorded here are some of the ideas of the conference relating to the setting which was thought to be conducive to the satisfactory realization of these opportunities. This chapter also considers the fourth general question posed to the conference by Dr. Darley: "How, and to what extent can the medical school help to improve the quality of community health activities?"

I. The Place of Preventive Medicine in the Medical School

Departmental Status

Because preventive medicine has so many affinities with other departments of the medical school, both in its teaching and in its research, some persons hold that separate departmental status is not necessary or desirable. For one thing, they believe that a separate department may cause duplication of teaching, and ask whether there is any inherent reason why instruction in epidemiology, for example, cannot be given just as well by another department, such as microbiology. Likewise, they say, since many other departments such as pediatrics and psychiatry now try to give students experience in comprehensive care of patients, departments of preventive medicine cannot claim an exclusive contribution in emphasis on community health resources. Finally, since all clinical departments should teach the preventive aspects of their fields, it is thought that having a separate department of preventive medicine may tend to dim their sense of obligation to carry out this function.

In general, those who claim that departmental status is not necessary or not desirable believe that preventive medicine has no special skills of its own to justify its existence as a distinct field, and that having a separate department may lead to either duplication or to gaps in teaching.

These arguments were seriously considered, but in general the conference felt that they were not of a kind to outweigh the advantages to the medical school in having one department exclusively focused on the preventive aspects of medicine.

We agree that the kinds of knowledge and the kinds of skills found in our field are indeed applicable far beyond the boundaries of segmented departmental teaching. It is, in fact, the very general applicability of this knowledge and these skills that makes it desirable to assemble a core of teachers expert in these matters

in one place—so that their contributions may be assured of being available and may be used most advantageously throughout the medical school.

To take the example used above, certainly epidemiology must be part of the teaching of a department of microbiology. Certainly, also, it must be part of the teaching of many other departments as well. The danger of having the *prime* responsibility for teaching this widely associating discipline identified narrowly with any one particular field, such as microbiology, is that the student may not discover its necessary correlations with the other parts of the whole range of medical science and practice. The same is true of many other matters taught by a department of preventive medicine.

While the development of teaching programs to demonstrate comprehensive care is, or should be, a concern of many other departments and almost by definition cannot be an exclusive concern of any single one, the close familiarity of preventive medicine with over-all community needs, organization and resources is a particular asset in the development and conduct of almost any such type of program. Working out methods whereby students may gain meaningful experience with the application of comprehensive medicine in the community has been and continues to be one of the particular contributions of departments of preventive medicine, as has been illustrated in previous chapters.

An autonomous department, again, may better conceive and execute research. It greatly facilitates the entrance of able young physicians into the field, both for teaching and research.

In brief, we consider that the department of preventive medicine has a special area of responsibility which includes but goes beyond the instruction of students in particular subjects. It must function reciprocally with every other department so that the medical school may produce graduates who are genuinely interested in health promotion and competent in the techniques of disease prevention. It is the combination of certain knowledge and skills with a certain point of view that is the unique contribution of a department of preventive medicine, not an array of exclusive skills. Dr. Stanley E. Dorst expressed this point very clearly:

"Surely we have been placing too much emphasis upon the possession of a 'special body of skills' as a primary reason for the development of separate departments of preventive medicine in many of our medical schools. Many of the basic science departments such as physiology, biochemistry and pharmacology, in a large measure share the same basic skills. I would go farther and say that many of our clinical departments are not to be differentiated on this basis, and contend that medicine, pediatrics and neurology all employ the same skills. This emphasis upon special skills may have been justified in an earlier day, but as medicine has become more complex, other values have determined the existence of special departments within a medical school.

"As the complex mosaic of modern medicine develops, certain groups with special interests, developing naturally with the division of labor in an increasingly

expanding field, came to possess special knowledge—and knowledge surely transcends skills. Knowledge through experience, that is the application of knowledge to the day's work, leads to understanding, and understanding is certainly the end of all education. It is, then, the acquisition of a fund of special knowledge and the understanding of the usefulness of this knowledge which, in my opinion, determines the right of a department to stand as a separate entity within the organization of a medical school.

"If this be true, then preventive medicine is certainly justified in claiming departmental status. You have a special knowledge which is not shared by your colleagues in the medical faculty—you understand the significance of that knowledge, and both the knowledge and your understanding are essential to the education of a medical student."

The thought that a separate department may promote duplication or gaps in teaching was believed to have little validity when preventive medicine is adequately integrated with other departments in teaching or service. As has been seen, a major focus of the conference was discussion of the need for such integration and consideration of practical ways to achieve it. Clearly, the responsibility of the various clinical departments for teaching the special preventive aspects of their fields should be sharpened, not dulled, through working association with members of a department particularly concerned with promoting health and preventing diseases in all fields.

Furthermore, the fact that the functions of a department of preventive medicine overlap those of many other departments may under many circumstances be an advantage rather than a disadvantage, since the department provides a common ground for conducting activities involving a number of departments. This follows the obvious principle that, as one member expressed it, "The greater the degree of specialization within a group, the greater the need of a counter-balancing wheel to aid in the coordination needed for a cooperative enterprise."

As another member stated, however, "If we may look forward to an ideal, a separate department of preventive medicine should not be necessary. Such indeed is true of many other medical subjects now delineated on a departmental basis. The future may well see some of these subjects so integrated into the programs of teaching and application as therapeutics has been, that the corresponding department may follow the path of the old department of therapeutics. The structure of medical schools at the present time, however, is such that an autonomous department or division is required."

Departmental status, of course, implies participation in matters having to do with policy making and curriculum; professorial rank for the head of the department; and adequate staff, quarters and budget. For research, suitable space and equipment must be available, and there must be access to experimental material, whether it be in the clinical field or in some other field.

Our conference did not try to draw blueprints for budget, personnel or curricu-

lum hours, recognizing that each school must work out its own answers to these important questions. The special problems of financing research in preventive medicine, however, were particularly noted.

Many of the studies in preventive medicine involve supervision of or contact with large groups of people for a long period of time. This may be extremely expensive, requiring both stable and sufficient financing. Securing funds for such research means competing with short-term laboratory and clinical studies which are frequently favored by fund-granting agencies. While it may be expected that special funds will be available for the support of the additional personnel and facilities necessary for long-term research projects, naturally the basic costs of personnel, facilities and equipment must be met from the regular departmental budget.

Certain general information about the present status of departments of preventive medicine was compiled for the conference. As regards administrative structure, among the 83 schools from which information was available, there are independent departments in 54 schools; preventive medicine is a subdepartment of medicine in 7 schools; it is combined with various other departments in 14 schools; and has no departmental status in 8 schools.

In terms of personnel and space, the information which was obtained is included in Appendix F. Information concerning budgets was not collected in sufficient detail to be reliable or useful.*

Interdepartmental Relationships

No detailed information on the extent of integration of activities of departments of preventive medicine and other medical school departments was secured. However, during the conference the Committee on Interdepartmental Relationships conducted a spot check of its members, consisting of faculty and deans from 19 different schools.† With respect to teaching among this group, the greatest degree of integration had been attained with medicine, microbiology, pediatrics and psychiatry, in that order. Except with the department of medicine, in terms of service to the hospital and to the community, and in terms of research, less than one-third had association with another department.

If this sample represents existing relationships of preventive medicine with other departments, the level of cooperative activity falls far short of the ideal. As has been reflected throughout this report, our conference repeatedly stressed the necessity of bringing into focus the activities of many departments, preclinical

* A more detailed analysis of these matters will be found in the "Survey of Medical Education," which was conducted under the auspices of the Council on Medical Education and Hospitals of the American Medical Association, and the Association of American Medical Colleges. (Deitrick, John E., and Berson, Robert C., *"Medical Schools in the United States at Mid-Century,"* McGraw-Hill Book Co., New York, 1953.)

† This information is based on a hasty recall by the participants, and is in no way full or exact. However, only examples of actual integration were considered, whether officially recognized or not.

and clinical, for the most successful teaching of preventive medicine both in the study of health and the natural history of disease, and in teaching the practice of preventive medicine on hospital wards, in outpatient departments, home care and family service plans, and the many other teaching situations which have been described. As has also been stressed, interdepartmental cooperation is equally important for research in preventive medicine.

Obviously, the degree of interdepartmental activity will depend on the particular functions of these departments and the particular interests of their members. It will also vary with different schools and with their opportunities. In order that cooperative purposes and efforts be furthered and successfully integrated, however, regular channels for communication of ideas between faculty members are essential. Two ways of accomplishing such communication were briefly discussed.

Joint Appointments—In some schools, joint appointments provide useful opportunities for integration of objectives and activity. The fulfillment of certain criteria seem to be essential for the successful operation of joint appointments. First, of course, the job of a person with a joint appointment must be one he likes to do. His activities in both departments should have a definite place in his long-term programs of training and professional advancement. Misunderstandings are often avoided when responsibility and salary derive largely or entirely from one department. There must be a clearly established place for him to work. Finally, the time required for meeting each of his responsibilities should be clearly delineated. Lack of clear understanding and demarcation of function have been the usual causes of confusion and dissatisfaction.

Several of our members who have had experience with joint appointments emphasized that such appointments do not reduce the total size of the staff needed, and should not be made with this purpose in mind. On the contrary, multiple departmental affiliations often require more staff and budget.

Interdepartmental Meetings—Interdepartmental conferences and meetings have been used profitably to discuss curriculum and conduct of teaching. Such meetings also may be concerned with the actual content of teaching as it is carried out, in addition to course schedules. In one school, for example, several members of different departments regularly go over their lecture notes with a member of the staff of preventive medicine so that he may introduce or point up factors relevant to prevention which might be included.

In general, we feel that every school should review the means which are available to it for common action among various members of the faculty in different departments, to bring out group action in actual practice. Certainly the department of preventive medicine benefits by continually examining its own teaching in relation to the teaching of every other department in the medical school, considering possible points of integration to meet existing needs. This appraisal also should embrace the areas of administration, research and service.

II. Staff or Consultants from Outside the Medical School

Since the turn of the century, medical schools have added faculty members from a wide variety of skills and disciplines. Medicine and medical education, despite the high degree of specialization within the profession, no longer depend solely upon the physician. Chemists, physiologists, pharmacologists, physicists and others are today considered indispensable members of teaching and research teams. This process of enrichment is never static; newer professional skills continually enter the medical school setting.

Our conference discussed the potential and actual contributions to preventive medicine which may be made by specialists in the social sciences, in public health and by persons engaged in community health activities. Some of these specialists come from within other departments of the university, others from the community itself.

From Within the University

One of the principal benefits that the medical school enjoys by being part of a university is the wealth of possible interchange among the broad variety of disciplines represented. The best interests of preventive medicine are furthered by strong relationships with many university departments.

Social Science Departments—There are optimal times when different disciplines join forces. As in the past, social science still observes and studies the actions of groups of people, in contrast to medicine, which focuses on the individual person. Now, however, the interests of both are coming together in examining the question of what the culture does to the individual. So, as medicine not too long ago converged with the physical sciences, the time may now be ripe for such convergence with the social sciences.

There has been for some time a growing tendency to bring disciplines such as anthropology, sociology and social psychology into the medical classroom, laboratory or hospital wards. The introduction of these newer specialists to medicine is often disturbing to those who believe that physicians should limit their activities to the diagnosis and treatment of disease. These critics believe that there is an essential dichotomy between the biologic and the social sciences—that the doctor's job is to heal the sick, and that it is up to the social scientists and social reformers to discover and improve the conditions that may predispose to sickness or perpetuate it.

The members of our conference, however, being primarily concerned with enhancing health and preventing disease, believe that the physician's function extends beyond diagnosis and treatment and that many and varied disciplines must contribute if physicians are to expand the knowledge of causes and the application of preventive measures. Stressing the latter point one member remarked: "Biological information and techniques are worthless unless they are

delivered. Then, on this account, sociology and other special fields such as public health administration are valuable and useful."

For example, the discovery that goiter is endemic in populations with iodine deficiency and the determination of the amount of iodine which must be added to the diet of this population were basic to the control of this disorder. For the incidence of goiter to be actually lowered, however, a way had to be found to introduce iodine into the routine diet of this population in a form that would be both acceptable and economically feasible. This called for cooperative efforts between medical science and many other groups—hence, iodized salt.

The social scientist in the medical setting has multiple opportunities, one of the most important of which is to participate with his medical colleagues in research into problems of which both are aware but which go beyond the present knowledge of either. Whenever groups of people are the object of research, the approach concepts and techniques of sociology and other social sciences are applicable and valuable. Growing interest in the ways in which social relationships modify disease patterns and concern for the measurement of the effects of medical activities upon groups of people augment the need for exploring the potential values to departments of preventive medicine of working with these fields.

Consultation with social scientists in appropriate fields may be useful, likewise, in developing programs to demonstrate comprehensive health care. For example, demographic studies can provide information insuring that representative cross-sections of the population are included in such programs. Studies of patterns of community leadership may help in the establishment of new programs.

Collaboration between medicine and these disciplines is so new that no set patterns of relationship have developed, nor should any be imposed. In some circumstances, collaborative studies will be pursued best when representatives of other professional disciplines are included on the staff of the department of preventive medicine. However, full consideration must be given to the possibility that these workers may be cut off from contact and identification with others in their own special fields. Joint appointments are one way of avoiding such dangers.

In teaching, social scientists may help in many ways to widen the student's perspective of medical practice in relation to the total social setting of which it is a part. They may also help the student to appreciate some of the kinds of problems involved in carrying out a prescribed course of action, as noted in Chapter IV. It was repeatedly emphasized, however, that the social scientist is still very much in the process of finding his way in this new area. As he learns more of the roles of the groups which comprise the medical team, learns more of the language of the team and reconciles his own terminology with ours, and learns more about his position on the team, he becomes a more valuable member of the team.

Schools of Public Health—In universities where there is both a school of medicine and a school of public health, close relationships in teaching and research are mutually advantageous.

For example, at HARVARD in the fields of psychiatry, pediatrics and obstetrics, as well as in the natural sciences, the implementation of joint programs by teachers of the two faculties bring points of view and skills that would otherwise be impossible.

A somewhat different approach has been adopted at JOHNS HOPKINS. Beginning in the academic year 1952–1953, the School of Hygiene and Public Health has been given a definite part of the responsibility for teaching public health and preventive medicine to medical students. This responsibility is being discharged jointly with an interdepartmental committee of the School of Medicine, a clinician serving as chairman.

This new teaching program at Johns Hopkins was undertaken as an expression of the particular philosophy of the committee of the medical faculty charged with considering the place of preventive medicine in the school. In this committee's view, preventive medicine has two distinct aspects: that which concerns the individual patient—where clinical departments should have teaching responsibility, and that which concerns groups of people—where the school of public health may have teaching responsibility. Such an experimental program is possible at Johns Hopkins since the School of Hygiene and Public Health is physically situated in close proximity to the School of Medicine, and members of its faculty have taught medical students for many years.

Teaching from Sources Outside the University

Departments of preventive medicine often use supporting personnel drawn from the community. Arrangements are frequently made with voluntary and official agencies to secure competent part-time teachers. This personnel should be of such caliber as to receive faculty appointments, and there should be appropriate salary arrangements commensurate with teaching responsibilities. For example, at JOHNS HOPKINS again, the obstetrician in the maternal and child health clinics is also associated with the state health department and has an appointment on the faculty in the department of obstetrics. His teaching covers clinical subjects as well as responsibilities in public health.

Such arrangements may work both ways; members of the staff in preventive medicine may take on part-time commitments with community agencies. It was reported that at least five professors of preventive medicine have served in dual appointments, acting as heads of local health departments as well as fulfilling their medical school responsibilities.

Just as joint appointments within the medical school require careful planning, caution must be observed where joint appointments are made by two separate agencies. One person must not be expected to handle two full-time jobs. The individual must be fully qualified for both kinds of jobs; working arrangements must be clearly understood and agreements concerning division of time be scrupulously followed. The danger that politics may confuse issues and cause divided loyalties must be recognized, particularly when a head of a department of preventive

medicine serves also as head of the local health department. In some communities the political situation precludes arrangements of any sort which involve the use of official agencies for teaching.

Some members challenged the basic premise of using part-time men in the development of departments of preventive medicine, believing that such arrangements have not in the past added greatly to either clinical teaching nor to research, and may threaten proper departmental functioning in our field. Most members believed, however, that a combination of community service and preventive medicine teaching, when properly planned with clearly defined responsibility, is, on the contrary, desirable for both purposes.

As one member stated, "The person who is working part-time on a medical school faculty and working part-time in the community laboratory is actually a full-time worker in the field of comprehensive community health activity. Therefore, we should not be too worried about it. . . . If one looks at the development of medical education, when we took over bedside teaching in hospital wards it was done on a part-time basis for a while, then it was discovered that we needed full-time teachers on those wards. We may come to that in our field, but I think if we can really get the concept of the community as a laboratory we won't be so worried about these joint and so-called part-time jobs."

III. Are Comprehensive Health Care Programs Necessary for Teaching?

The need for experimental work areas for preventive medicine has been amply illustrated throughout this report: besides access to laboratories within the medical school for our research, we believe that the community itself provides such a laboratory; besides access to patients on hospital wards and clinics, we believe that the community again offers opportunities as a teaching laboratory, both in helping students understand the nature of community resources and in observing patients in their homes. Rather than endorsing any one particular type of teaching program, whether in general clinics, family care programs or whatever, we underlined the need for experimentation with many types of programs designed to demonstrate to students the scope of comprehensive health care and services.

However, recognizing that there is far from universal agreement that such programs in fact do merit consideration and trial, some of the arguments most frequently raised against them were considered by our conference.

While agreeing that it is essential for physicians to consider the social and preventive aspects of medicine, many members of medical school faculties believe that the traditional departmental teaching on wards and in specialty clinics of outpatient departments gives the student an adequate groundwork of experience in these matters. When physicians finish their hospital training and actually begin to practice medicine, it is thought, they quickly learn to

meet wisely and imaginatively the day-to-day needs of patients for health supervision, medical care in long-term illnesses and rehabilitation, and to properly use community health resources.

Although objective proof is lacking either to support or negate this assumption, our conference considered that these and other skills in comprehensive patient care are too important to be left to chance, and should be developed as part of the student's regular training. As one bit of evidence to challenge the belief that doctors automatically pick up the requisites of comprehensive health care after graduation, experience from the Health Resources Survey conducted by students from HARVARD was cited.

Here for five years the students have been engaged in these surveys, as described in Chapter IV, and cover at least one community in each of about 30 states every summer. In the course of assuming that they were in practice and attempting to take care of their hypothetical patients, they have talked to doctors in these communities and investigated available community resources. Their professor reports: "They all come back with the same statement, and they are surprised by it. They say, 'It was very curious, but the doctors that I talked to didn't seem to know what facilities were available within their own community which could help them care for their own patients'."

Another frequent objection to the development of new programs is raised in the belief that comprehensive health care can be taught adequately within the existing structure of the curriculum by expanding existing facilities. Yet the record to date indicates that this point is probably invalid. Each department's interests quite naturally focus on research, diagnosis and treatment in its own special field. Consequently, it would seem that teaching designed to achieve a broader view must come through a correlated interdepartmental program under definitely assigned and accepted leadership.

A third objection is that community health is so fractured by multiple services that their successful use for teaching is impractical. The conference believed, however, that the times demand that students become aware of just these complexities. Detailed knowledge of each and every community resource is clearly not our objective.

The most serious criticism of such new programs is that there is insufficient time for them in a four-year curriculum without sacrificing basic scientific training and other necessary experience. While it is fully appreciated that presentation of scientific knowledge and the art of its application to the problems of the sick are in themselves formidable assignments, our conference believes that careful and thoughtful curriculum planning can permit students to obtain a broader experience without any loss of essential departmental teaching. For example, in the CORNELL comprehensive care and teaching program, five departments are now in continuous contact with students for four and a half months, whereas before their teaching was in mutually exclusive short blocks of time. A student's out-

patient experience now, in fact, includes teaching from more departments than before their program was initiated, and it is a really coordinated experience.

Furthermore, with all due respect to the great gains made in medical education under the present system, we suggest that many hours of the four-year course are spent in activities which have little relevance to the undergraduate training of an "undifferentiated physician." A thoughtful review of the daily calendar of the busy student might well lead to a release of adequate time for orientation to the patient in the setting where the doctor will see him most—in the home or the office, and for the development of a more inclusive point of view to the physician who engages in other health activities.

Theory and practice are different matters. Whether teaching time should be released by other departments is, of course, a different question from whether it will be, at any given school. In presenting a report from our conference to the Association of American Medical Colleges, one of our members praised the generosity of a particular department in giving up some of its time to preventive medicine for a certain aspect of our teaching. A dean seized on this remark to query, acidly: "Is 'time' departmentally possessed?" Realistically, of course, it is. The success of instituting newer programs depends ultimately on the philosophy and teaching objectives of the school and of the heads of its major departments.

Finally, such programs are criticized because they pose additional budget problems. Like the question of teaching time, the problem of finance is inter-related with other considerations and must be met on the basis of the individual school's situation, its decisions as to what it wants to teach, and what use it wants to make of its available personnel.

Some of the programs described in this report have required no budgetary increases. Some, as at RICHMOND and at NEW YORK UNIVERSITY, depend on using a service program already operating in the community. In considering resources for teaching various aspects of comprehensive health care, better use of existing service programs should be explored. For example, carefully worked out preceptorships and community hospital experience for students offer a fertile training opportunity which makes no demands on existing school budgets. For more comprehensive programs the addition of personnel is probably mandatory, but the additional expense seems well justified.

IV. Improving Community Health Resources

What is the degree of responsibility of a medical school to its community? When this question concerned the improvement of community resources for better teaching of medical students, the conference seemed in general accord. When it concerned the larger aspects of community service, there was more lively discussion.

There was agreement in principle that where a community service program is

desirable for teaching purposes, a department of preventive medicine may properly take an active interest in its development or improvement.

As one member stated: "To afford a better training experience for the students, the medical school—perhaps almost specifically the department of preventive medicine—should assume some responsibility for initiating programs of medical care in the community. I look upon this responsibility as very similar to the responsibility of any other department head. The head of a department of physiology, for example, has a very distinct responsibility to obtain the best departmental laboratory that can be obtained for the teaching of his students. And so, too, the head of a department of preventive medicine has a responsibility for seeing that his students get the best possible experience in the community in those various agencies which he uses for the teaching of his students."

The debate became most active, however, in considering the final general question posed to our conference:

> How and to what extent can the medical school help to improve the quality of community health activities?

Obviously the primary contribution of a medical school in improving the quality of community health must be through preparing well-qualified physicians at the undergraduate and graduate level—flowing on into programs for continuing education; and through advancing scientific knowledge through research. In its teaching hospital, the school provides a quality of medical service to a limited segment of the population which, it is hoped, raises the level of practice in the particular town or city where it is located. Beyond this, the problem is to achieve a dynamic equilibrium between good medical teaching and good medical practice in the community.

Some members of our conference feared that extension of medical school responsibility for service to the community beyond the areas of research and teaching might upset the present balance of function and detract from the fulfillment of the primary objectives.

While agreeing that a medical school must avoid assuming a burden of service so large as to constitute a danger to teaching and research, most members felt that with proper safeguards there is no inherent conflict between the primary function of a school to teach those who come for education within its walls, and the function of also applying the skills and the knowledge of its faculty to problems outside its walls. The success of the land-grant colleges' schools of agriculture in this respect was noted. These schools demonstrate how it is possible to conduct simultaneously a program of education for specialized personnel in agriculture, a program of basic scientific research in agriculture and a program of application and broad community education in agriculture.

In any event, it is increasingly evident that the medical school is being called upon to expand its activities in all three areas of teaching, research and service. Accordingly, it may be assumed that the medical school will carry new responsi-

bilities in research oriented to the social problems in medicine, in providing leadership in the development of community health services, and in working with and assisting other community health agencies.

We emphasize that medical schools can discharge most of these new responsibilities effectively only if they are provided with additional resources of budget and personnel, just as in the past the extension of medical school activities to include bedside teaching depended upon expansions in trained personnel and teaching facilities.

Leadership in Community Health Activities

Even without such expansion, or perhaps as a prelude to it, the medical school can offer leadership and guide the development of needed health programs and activities by other community agencies. One clear way to achieve this is for faculty members generally, not just the staffs of departments of preventive medicine, to take a working part in health councils, professional societies and on boards of community health agencies.

At CINCINNATI, for example, the municipally-supported medical school has over some period of time built up a close relationship with the community through these means. Twenty-five years ago many faculty members took part in organizing one of the early health councils of this country, the Public Health Federation. This body has been a tremendous force in developing and expanding the health services and resources of the city.

Participation by the school has continued, and today a core of faculty members takes an active part in the Federation, its component councils and member agencies. Several of the faculty have served, and still do serve as members of the board of health, as officers of the Federation and as officers of the various professional societies. The Academy of Medicine meets in the medical school and uses many of its facilities, including the medical school library. This participating interest by the school in community life is one of the reasons why there has always been unusually close rapport between "town and gown" in Cincinnati.

Partly due to faculty leadership, the Public Health Federation from the very beginning insisted upon cooperation with the medical profession, other professional groups and lay civic leaders. The good relationships that ensued made possible many achievements in community health. Some of these are: a community-wide diphtheria immunization program; reduction in the number of appendicitis deaths following an intensive detailed study of the mortality from this cause in the city; passage of a bond issue which permitted the development of a modern tuberculosis sanatorium; passage of a bond issue which brought about the erection of a modern chronic disease hospital; creation of a central mental hygiene clinic.

Faculty participation in city health affairs also has brought the confidence of the community in the work of the medical school and has assured support for its many projects. The degree to which the community has given its trust is shown

by the fact that the university and medical school have the sole responsibility, without political interference, for the operation of the city's general hospital, although it is entirely tax-supported.

Participation by the faculty on survey and planning committees for improvement or integration of community health activities is another useful area of activity, since faculty members have a unique position of impartiality. The staff in preventive medicine particularly can contribute consultant services in the correct use of biometric methods in survey planning.

For example, in Richmond the needs for medical care of the indigent were surveyed in 1947 by the Richmond Area Community Council with active cooperation from the department of preventive medicine of the medical school.

The recommendations resulted in the comprehensive health program described briefly in Chapter V. Replacing an unsatisfactory city-physician arrangement, the new program has produced a far greater range and volume of service. For example, there has been a marked increase in number of home calls—one per patient per year more—and almost twice the number of hospital days, for essentially the same amount of money as was formerly spent. This has been achieved by coordinating the activities of the many agencies involved, by utilizing the available resources more effectively and by maintaining a close administrative control.[1]

The record at Denver provides another example of leadership in community affairs provided from within the faculty of a medical school.[2] For decades both the state and city health departments were far below minimal standards for such organizations. These were separable problems, however, since the state organization operated with grossly inadequate budgets and archaic laws, but had a hard core of able, devoted and trained personnel. Denver could have provided a basically adequate program, but its city officials were uninterested, uninformed and patronage-minded.

For many years citizen groups had attempted to bring about improvements, but had always failed. Each effort, however, brought better understanding of the issues so that finally, separate intensive campaigns culminated in the successful reorganization of both the state and city health departments.

Medical school faculty, particularly from the department of preventive medicine, participated both in the early attempts that resulted in failure and in the final efforts that achieved success. As a consequence, the medical school became better known in the community. Interlocking positions were created in which faculty members in psychiatry, obstetrics and pediatrics worked in both the state health department and in the medical school, resulting in improved service to the community and in better teaching of medical students. Many postgraduate courses are now jointly sponsored by the state health department and the medical school. The department of preventive medicine participates in community surveys designed to improve local health departments in the state.

The stature of the medical school has increased as a consequence. This has helped achieve increased budgetary appropriations for the institution.

The benefits that flowed from a reorganization of the Denver Department of Health and Hospitals have been even more striking. The Denver General Hospital is now closely affiliated with the medical school. Better care is given to the medically indigent of Denver because this care is supervised by the medical school faculty. The school now actively uses the hospital for teaching not only medical students but also student nurses, gaining a much needed expansion in its teaching facilities. Joint programs such as the General Medical Clinic are now in operation, making it possible for medical students, interns and residents to participate in broad training programs that emphasize the community aspects of medical practice.*

On two occasions a revitalized city administration has called upon the medical school for one of its faculty members to assume leadership of the activities of the department of health and hospitals in time of real need. This close liaison has resulted not only in more effective community service but in much improvement in teaching. It has worked to the marked advantage of everyone.

Continuing Education of Physicians and Other Health Personnel

Medical schools are increasingly active in establishing programs designed to help practicing physicians and people in allied fields keep abreast of new developments in medicine. There are many examples where departments of preventive medicine share in providing opportunities for carrying out this function of medical education by arranging short demonstration courses in cooperation with other departments of the medical school, hospitals and local health agencies. Many departments, for example, give periodic courses in industrial medicine, and collaborate with other departments in refresher courses for physicians in such subjects as child health, cancer detection and management of heart disease in children. A number of departments have responsibility in postgraduate instruction of nurses.

Likewise, teachers of preventive medicine may take part in the training of health workers in local community agencies, either by providing instruction and guidance in specific fields or interpreting the broad philosophy of preventive service. Some schools, such as at the UNIVERSITY OF WASHINGTON, conduct regular seminars for the public health personnel in the area.

Where community health agencies are used for teaching, the medical students themselves may serve to stimulate the staff workers to keep up with current developments. "When a student visits an agency or institution he is delightfully frank and uninhibited in his inquiries. There is no particular reason why he should hesitate to ask about something which looks to him queer or inadequate. A more sophisticated visitor or official inspector might be shown only the bright spots, or

* See reference No. 3, p. 10.

for reasons of diplomacy not wish to cause embarrassment by dragging out the dirty linen. But the student charges into a delicate situation, not realizing that it is delicate, and is free in expressing his opinion."[3]

Pilot Studies and Demonstrations

Another frequent contribution to improvement of community health service is through pilot studies or demonstration programs organized under the auspices of the medical school, but designed to lead to action by other community agencies.

The department of preventive medicine at NEW YORK UNIVERSITY, for example, made a year's trial to test the practicability of discharging patients from a municipal hospital before they were ambulatory, and providing care through a home care program. A favorable report was made, and the hospital department of the city subsequently inaugurated a permanent home care program on a city-wide basis.

A program conducted at VANDERBILT illustrates another type of demonstration project. Here the department of preventive medicine, in cooperation with the State Health Department of Tennessee, undertook studies of the distribution, incidence and control of malaria in the western part of the state. Laboratories were established in the county health departments of two different counties in successive years, staffed by a member of the department of preventive medicine, a technician and medical students. These studies, over a three-year period, were the basis for a control program by the state health department.

State Planning

As an example of even more extensive participation in community affairs, the health planning activities at the UNIVERSITY OF NORTH CAROLINA were described. Here the university medical center has been charged by the state legislature to "develop a philosophy of medical education, research and medical care which will make it a service facility for the whole state."*

Instead of establishing an over-all state planning agency for health, the legislature delegated this broad responsibility to the university, as an objective stable resource not subject to the storms of local politics. It is realized that special funds are needed for this purpose. Up to the present these have been supplied by the Rockefeller Foundation, but funds for the continuance of this function are being requested from the next state legislature. A special staff has been appointed so that no undue burden has been imposed on the regular faculty of the medical school. A number of other sections of the university are involved, such as the school of public health and the institute for research in social science.

So far, the procedure at North Carolina has been to gather information county-by-county throughout the entire state, to learn of all the agencies that exist and

* The use of the term "service" in this connection, it was explained, meant *planning* service, not actual provision of medical care by the university over and above its usual commitments in teaching hospital and clinics. It would also include extension services of various types as developed in regionalization programs.

the kinds of service that are required. "Out of this we expect to move ahead and decide on issues. For example, do the six agencies in the State which undertake services for the blind and visually handicapped do their job well, or don't they? And how do they relate to one another?

"We work together with the other two medical schools in the state on specific problems in which we have a common interest. For example, there are two of these schools only 12 miles apart—one of the first things we did was to work on a coordinated clinic schedule so that the relatively infrequently scheduled clinics would not be held simultaneously in both centers, thus making these services more frequently and generally available to the people living in the surrounding area."

It is believed that this state planning activity will benefit both the teaching and research programs of the medical school by providing access to defined "community laboratories" of varying characteristics.

Some members of the conference, however, doubted whether such a high degree of participation by a medical school in community health was advisable. "How do you know that the state legislature won't cut your appropriations, and hold the school to the same requirements with half the staff?" It was agreed that such extensive commitments were somewhat in the nature of a gamble, but that the benefits which probably accrue to the university generally, in terms of better community relationships, and to the teaching of preventive medicine specifically, in offering a broader setting for teaching and research, may make this gamble worth taking.

In whatever sphere, some degree of active interest in the health of the community was considered essential for staff members of departments of preventive medicine. "A professor of medicine can never be in an ivory tower, his patients are right there every day . . . but a professor of preventive medicine runs the risk of getting pretty theoretical about community health resources if he's not mixed up in them."

Finally, in trying to realize another broad objective of medical education, probably only through the actual working example provided by his teachers in various departments of the medical school can the medical student gain an understanding of the principle: "Of being mindful of his obligations to the community as a physician, with reference to the community's problems of health and disease, and equally as a citizen."

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Chapter VII

Commentary by Dr. Alan Gregg*

THE FOLLOWING TALK by Dr. Alan Gregg, to a plenary session of the conference, put into sharp focus so many aspects of preventive medicine that it is included here in its entirety to serve as a general summing up:

This is a command performance, a repetition of what I gave voice to yesterday, during one of your committee meetings, and I think therefore I might explain the circumstances under which I made the remarks. They were the effect of listening to a large number of comments and a somewhat jerky exchange of opinions that reminded me of a sign that used to be outside the railroad station in Tokyo before the war. The sign read: "S. Makamuri & Company, Transfer Forwarding Agents. Your baggage sent in all directions."

Now the comments were so frequently those of an additive nature, or occasionally a blunt dissent, that I got fascinated by the procedure simply as a study of confusion.

Then it occurred to me that if some 25 persons went to Wisconsin and attempted to comment on the peculiar topography of that state, we would begin with confusion. We would have suggestions that the lake formation in Wisconsin is very luxurious and that most of the longer diameters of the lakes run from northeast to southwest. And how could that be explained? Someone would say that it is mere chance. But that wouldn't be the answer. Why doesn't it occur somewhere else? And then the reply would be that it does occur in Finland.

Then a question would be raised as to the presence of drumlins, and somebody would say that was due to moundbuilders. And then somebody else would point out that those mounds don't have anything in them. And that would be a partial but unsatisfactory answer. And then someone would bring out the fact that many of the rock outcroppings are marked with scratches that must have been done by some prehistoric people. And then it would be pointed out that all the scratches are single-lined with no figures, and they all seem to run in the same direction. And that would lead nowhere as an explanation. Then somebody would say that most of the boulders look as though they were water-worn. And people would say there couldn't have been so many rivers running in so many different directions.

And at long last someone would come out with a hypothesis that the topography of Wisconsin can be explained by glaciation. And that would cover all the observations and explain them all.

* Dr. Gregg is vice president of the Rockefeller Foundation.

Now I want to offer in a very tentative mood a hypothesis about the confusion that I witnessed yesterday and to some extent today. And I'm going to take you far afield in the beginning.

The Greek idea of virtue was that your conduct should be consistent with your convictions. That was in some contradistinction to the Roman idea of morality, which was that your conduct be that which was expected of your profession, your age, your sex and your status in society. And if you met those qualifications you were a moral person.

It only takes a little reflection to realize that you can be moral today without being virtuous, according to those two definitions. You can do exactly what people expect of you but at the same time not follow your internal convictions. You can be moral without being virtuous, or you can be virtuous without being moral. As an example:

If you were on the Pennsylvania Turnpike, where it is expected that you go 60 miles an hour, there is your moral conduct outlined for you; but if as a piece of private conviction and knowledge you happen to know that both of your front tires are about to blow out, you had better, and you will go 35 miles an hour, even though everybody honks at you. You will be honked at if you don't follow the morals. But still and all, in going 35 miles an hour, your conduct will be consistent with your convictions: you will be virtuous. And that, I think, is the main problem.

Now this is a very risky thing to say to more than five people, but in order to convey the application of this idea of Greek virtue and Roman morality I would suggest your tentative reflection on the fact that what is commonly known as curative medicine is in the general field of morality, and that preventive medicine has the charm and bewilderment and the opportunity of being virtuous, because applying preventive medicine is behaving as we should behave in the light of what we know of the vast capacities of medical science.

Preventive medicine has three characteristics. First of all it is mature, and it is towards the latter stages of the knowledge of medicine or the practice of medicine that we begin to think about what we should have been doing or should do in the light of our knowledge of the facts. And I would call attention in passing to the fact that the thing we all accept as the great condensed and beautiful statement of the ethical duties of the medical profession, namely, the oath of Hippocrates, has not one single reference to the duties of preventing disease. That is not the fault of the oath, but of the fact that at that time there was not enough knowledge of disease to involve ideas of prevention.

Secondly, preventive medicine is comprehensive. And God knows, from the variety of suggestions of how many places the preventive attitude could be taken to, we've got ample proof of the fact that it is comprehensive. It is certainly comprehensive. And don't complain if it is comprehensive, because by its nature it must be. It is the application of what is known, and what is known now is pretty extensive. It's going to grow.

The third thing about preventive medicine is that I would describe it as being eventual, in a sense that after a man has looked at and worked in almost any field of medicine, towards the end of his life I think I'm right in saying that I detect an increasing interest in prevention.

Now I suppose that this attitude of prevention came as a result, or as the latter of a series of steps. The first we might describe as the beginning and growth of nosology; namely, the recognition of disease, the description of disease and the definition of disease.

Along with that growing classification of diseases there came, especially as the result of Pasteur's work, and Lister's, the realization that etiology was a formidably important part of the knowledge of disease. And with etiology as well as the principles that Pasteur was largely responsible for showing mankind, we got a glimpse of the true nature of communicable diseases. And that led off almost at a right angle into something quite new for medicine; namely, the concept of looking at the mass of human beings rather than just at the sick individuals. As a result of that enormously profitable way of looking at disease as it affects masses, there grew out two clear and firm new disciplines (they started as attitudes and ended up as disciplines); namely, epidemiology and biostatistics. And I don't think we ought to quarrel with the fact that those two seem to float up to the surface of many of our minds as being some of the most important parts of preventive medicine, because they have now attained the stature of disciplines. And they are firm and they are solid and they are dependable.

After that attitude of looking at disease as it affects the mass, there has come relatively recently the concept of ecology or what is covered by the term ecology. The emergence of such a subject as ecology is simply an example of the fact that our horizon is getting wider and wider. Ecology is a comprehensive term; it also is still in the position of being an attitude rather than, strictly speaking, a discipline.

The ecological approach prepares us to accept the enormous value of sociology, because sociology takes as its subject of study the mass and the inter-reactions within the mass of population.

Also, preventive medicine is coming to extend itself to the study of emotions. And I think it will be within the lifetime of practically everybody in this room for psychiatry, applied to large numbers of people and to their inter-reactions, to become a legitimate locus of inquiry by persons who are interested in preventive medicine.

Now the place of preventive medicine is curious in the medical curriculum, and it is curious for this reason: the other divisions or specialties of medicine are distinct from each other, it seems, on the basis of considerations such as anatomical regions, or organs: ophthalmology, ear, nose and throat, gynecology, neurology—these are either areas of the body or they are organ systems. That's one basis for separating our subjects. Another division is the operational attitude; the operational attitude being the line of cleavage between medicine and surgery. A

third is the age of the patient, from which we derive pediatrics and are in the business of deriving geriatrics.

Can you say that preventive medicine is separable by similar lines of differentiation from the rest of medicine? No, it isn't. Preventive medicine seems to me to be cutting the whole business in an entirely different plane. Preventive medicine seems to me to be a matter of attitude. And I shall define what I mean. For one thing, the attitude is that it is possible to combat disease, and that diseases are entities. Now the old French aphorism "*Il n'y a pas de maladies, il n'y a que des malades*," meaning: "There are no diseases, there are only sick people," is in my opinion essentially false, though useful at times. And my contention would be that preventive medicine says there *are* diseases, and their natural history and their inter-relationships to insects, for example, are matters of considerable importance—and more important in that we can attack them.

If it is an attitude that we take when we say preventive medicine, I am not in the least surprised that nobody really wants to set a limit on research that will be under this grouping, because it isn't restricted to an area, or an age group, or an exact method of operation; it's an attitude towards diminishing disease and maintaining health.

I think it would be extremely interesting just as an amusing experiment to run a little questionnaire of this group, "Please put down 20 signs of health." Well, you know, every one of us, as fast as we could write, could put down 20 signs of disease. Why don't we pay more attention to signs of health? I believe there are such. I got one from Professor Passmore in Edinburgh who said, "I know that I am healthy because there's a little stream in the meadow that I have to cross before I get to my laboratory, and there's a little footbridge over that stream. On the days when I dispense with the footbridge and take a run and a jump over that stream, those are the days that I know that I'm healthy."

That's a smart observation, in my opinion. It really means that the prodigal expenditure of energy is a sign of health: when you indulge in the prodigal expenditure of energy, doing something in a very fancy way, you are probably not sick or depressed.

The other point of this attitude is, and I now relate back to my Greek concept of virtue, that we are doing these things in behalf of people who are not doctors, who do not know the enormous strength that we can mobilize; we're doing it in their behalf. And sometimes doctors don't have that interest as deeply as they should. I'm reminded of a bitter story that I picked up in France which illustrates this attitude. A château was on fire and the owner of the château called his servants and the village population to his assistance. They didn't have enough water so he changed his orders and told them to get the furniture out. And they were busy getting the furniture out when the master of his stables came up to him and said, "Sire, the stables have caught fire." And he said, "Never mind the stables, come and help with this furniture." The master of the stables looked him

dead in the eye and said, "Sire, no one could accuse you of taking a horse's point of view."

Our attitude toward the existence of disease, it seems to me, should be one of resentment expressed in the phrase, "Why do these things have to keep occurring? Why do they have to continue? Why do they have to be, in the light of what we privately know?"

That attitude will explain why the word "permeation" keeps coming up all the time, that "the preventive attitude should permeate all the departments." Sure it should. It isn't a separate category, it isn't a separate part of the anatomy, it isn't a separate age group, it isn't a separate operational procedure; it's an attitude: "Why do these things have to be—why can't we attack this disease?"

Now a little light-heartedly, I've taken a great risk in telling you that you are virtuous, or implying that you should be, where other doctors are only moral. And I want to catch you up a bit on that. Because, of course, people who have terrific convictions are in some measure dangerous. You will remember the definition of a zealot as anyone who redoubles his efforts when he has lost sight of his aim. Or the charming remark, somewhere in Kipling, "The most terrible thing in the world is a band of ruffians led by an aristocrat; nay, there is one more terrible: a group of Scotch Presbyterians arising from their knees to do the will of God."

Now I warn you of the conviction that your virtue will give you. And it is for that reason, principally, that I want to repeat and underline Dr. Shepard's remarks about the importance of health education, because if we don't get people to ask us to do what we want to do and know we can do, we will be swiftly in the position of dictators, and pretty cruel ones, and will be resented as that and lose our status, amateur or professional.

We want to get people to understand what medicine could do, and I think the education of the laity includes the medical student (because in many senses they are laity with us, until they are finished)—but I think we've got to get ourselves in the position of being demanded to do the things that we can do, and that we know that our other colleagues in medicine can do.

To put this in somewhat flippant and secular terms, my favorite limerick runs:

> There was a young lady from Siam,
> Who said to her lover named Priam:
> "To kiss me of course
> You'll have to use force,
> But God knows you're stronger than I am."

That is, as it were, the essence of the art of bringing on a demand. And that, I think, is definitely one of our jobs. You can say it is far afield from medicine. It certainly is. But I think we have a great deal to learn from the advertising profession in this matter. A friend of mine said to me that there are currently only three groups of people who know much about handling masses: one is the

Soviet government, the second is the Catholic church, and the third the American commercial advertisers.

Now I will move on to something different. I will dispense for the moment with secular motivation and I'll say that it seems to me that the driving motive of this attitude of preventive medicine was best said by Christ when He explained why He had come—"I am come that they might have life, and that they might have it more abundantly."

Now "more abundantly" is the promotion of health.

Only one other thing. There is a nice quotation from Paul Valéry, which runs: "You must live as you think. If not, sooner or later you end up by thinking as you have lived."

Appendix A

Background and Organization of Conference

THE ROOTS OF this conference were in an earlier Conference on Preventive Medicine and Health Economics, held at Ann Arbor, Mich., in 1946. The purpose of this first meeting was: "To define the field of preventive medicine, its relation to the whole of medical education and the methods and materials that might be utilized to integrate preventive medicine with other subjects, and other subjects with preventive medicine in the medical curriculum," and "to consider the developing field of health economics and the possible roles of professors of preventive medicine in research and teaching health economics to medical students."

While real progress was made at Ann Arbor, the participants realized that they had taken only the first steps towards reaching the goals that they had set. Consequently they recommended another meeting within a few years.

Planning for this second conference, here reported, began in 1949. An *ad hoc* committee formulated a proposal for such a meeting and presented it to the Conference of Professors of Preventive Medicine, an informal standing organization, at the time of the annual sessions of the American Public Health Association in 1950.* This group endorsed the plan for a five-day conference, and named a chairman, Dr. Lloyd Florio, and two co-chairmen, Dr. John H. Dingle and Dr. Ray E. Trussell, as the nucleus of a planning committee.

The Rockefeller Foundation made a grant of $15,000, the first of a series of generous contributions from various private and governmental sources that made the conference possible.

Subsequently, over a period of more than a year, the planning committee of nine members met four times. Their design for the conference was as follows:

General Policies

1. To bring to the conference the experience and perspective of deans of medical schools, the Association of American Medical Colleges was asked to collaborate in its planning and operation. The Association agreed to co-sponsor the meeting, and appointed its president-elect, Dr. Ward Darley, as co-chairman.

The conference was scheduled just prior to the 63rd Annual Meeting of the Association, at the same hotel in Colorado Springs.

2. The conference was planned as a work session in which all members were expected to contribute to the deliberations through participation in one of five committees devoted to the major topics of the conference: curriculum content and methodology, interdepartmental relationships, comprehensive health care, community health activities, research.

3. Preconference committees prepared documented agendas to serve as a basis for discussion of the five topics to be considered. The chairmen of these committees also served as chairmen for the corresponding committees at the conference.

Members of the preconference committees were not limited to teachers of preventive medicine, but included other individuals who would be likely to make significant contributions.

Each member of the planning committee, with the exception of the chairman, served in a liaison capacity to one of the committees, to draft a tentative charge for his particular committee, to assist the chairman in selecting his committee and to serve as advisor.

4. Objectives of undergraduate medical education and of the teaching of preventive medicine were needed to serve as a frame of reference to help the conferees in their consideration of the subject matter of the conference. Statements were prepared by the Association of American Medical Colleges and the planning committee of the conference, respectively. A detailed annotated bibliography, "Social and Preventive Medicine Content and Teaching Methods," was prepared by the Division of Public Health Methods of the Public Health Service.*

5. An editorial committee was appointed to prepare the final report of the conference.

6. In order to secure maximum active participation, the number of conferees was limited to 140 members.

* The Conference of Professors of Preventive Medicine was organized in 1942 and meets every year at some time during the sessions of the American Public Health Association.

* Copies of this document are still available, although in limited supply. The bibliography is currently being revised to include papers published in 1952, and certain selected material from foreign literature. Requests should be addressed to the Division of Public Health Methods, Public Health Service, Washington, D. C.

Members were selected in the following manner:

a. Each medical school in the United States and Canada was asked to name a representative with responsibility for teaching preventive medicine.

b. Deans of all medical schools were asked to attend. A number of deans received special invitations in view of specific contributions which they might make.

c. Other individuals were invited, as particular representatives of special fields covering a broad range of interests.

The Preconference Committees

The planning committee appointed chairmen of committees to prepare the background material for conference discussions and to draw up the agendas.

Committee I—Curriculum Content and Methodology

Chairman: E. Gurney Clark
Recorder: Robert E. Shank
Planning committee liaison members:
Hugh R. Leavell
John P. Hubbard
Members:
William L. Fleming — John J. Phair
William W. Frye — R. Percy Vivian
Russell A. Nelson — Adolph Weinzirl
Henry Packer
Consultants:
Duncan W. Clark — Leonard S. Rosenfeld
Leonard J. Goldwater — Helen Woods
Sophie Rabinoff

*Charge to Committee**—The Committee on Curriculum has responsibility for consideration of the scope, present practices and desirable future patterns designed to achieve the objectives that have been set forth in the broad field of preventive medicine and public health. Included in this study are:

1. The *body of knowledge* which should be included in the training of medical students to equip them in the field of preventive medicine and public health. The committee is requested to give consideration to such subjects as biometrics, the natural history of disease, the prevention of disease and accidents, the role of the physician in community health and the socio-economic aspects of medical care. Specific consideration should be given to:

The material or subject matter which might be taught to best advantage in the department of preventive medicine.

Those aspects of preventive medicine which might be taught to best advantage in other departments.

2. The *optimal time* in the course of training in the teaching of the various elements.

3. General *methodology* of teaching, such as:

The learning process as it applies to medical students.

Audiovisual aids.

Participation in family care programs.

Field visits and training experiences related to public health and social agencies.

student internships in preventive medicine.

This committee has overall responsibility for consideration of the total problem, including integration of the special fields, allocated primarily to the committees on: interdepartmental relationships, comprehensive health care, community health activities and research. These latter committees, however, may be expected to deal with their special problems in a comprehensive manner and at the same time to consider services, teaching content and methodology of their special fields.

Committee II—Interdepartmental Relationships

Chairman: Glen R. Leymaster
Recorder: J. Wendell MacLeod
Planning committee liaison member:
John H. Dingle
Members:
T. Hale Ham — Harold E. Pearson
Paul Harper — John Romano
Clayton G. Loosli

Charge to Committee—It is suggested that the role of the department of preventive medicine in a medical school with respect to interdepartmental relationships be considered under several general headings:

1. Objectives of undergraduate medical education and the department of preventive medicine as they affect interdepartmental relationships in regard to teaching, service and research.

2. Teaching relationships, including integration of course work in fields of overlapping interests, joint seminars, joint appointments, etc.

3. Service relationships with other departments, including such aspects as biostatistical assistance, consultation, diagnostic laboratory service, operational functions with or within other departments, comprehensive medical care, etc.

4. Research, as far as it may involve other departments within the medical school.

5. The consideration of optimum personnel and budget in relation to the above subjects.

Committee III—Comprehensive Health Care

Chairman: C. Howe Eller
Recorder: Henry J. Bakst
Planning committee liaison member:
Ray E. Trussell
Members:
Harry L. Chant — George Saslow
James P. Dixon — Cecil G. Sheps
E. M. Holmes Jr. — William R. Willard
George Rosen
Consultants:
John B. Grant
Lester J. Evans

Charge to Committee—1. A working definition of comprehensive health care.

2. The responsibility of (a) the medical school in general, and (b) the department of

* Charges to this and other committees are quoted as set forth by the planning committee and modified by the preconference committee for each topic.

preventive medicine in particular, for comprehensive health care.

3. Current examples of participation in programs by departments of preventive medicine for comprehensive health care with specific reference to such approaches as hospital care, outpatient services, home care services, etc.

4. Evaluating student participation in comprehensive health care.

5. Responsibilities and opportunities of departments of preventive medicine for research in comprehensive health care.

Committee IV—Community Health Activities

Chairman: Thomas D. Dublin
Planning committee liaison member:
Duncan W. Clark
Members:

Leona Baumgartner	Paul A. Lembcke
Gordon W. Blackwell	Henry E. Meleney
Antonio Ciocco	Mary L. Poole
Stanley E. Dorst	Leland E. Powers
Alfred L. Frechette	Hart E. Van Riper

Consultants:

Charles S. Cameron	John B. Grant
Lester J. Evans	Leonard S. Rosenfeld

Charge to Committee—The role of a department of preventive medicine, its medical school and university, in community health activities.

The committee suggests the four general questions listed below as basic issues for conference consideration:

1. Why should the community be utilized in medical education?

2. How can the resources of the community best be utilized and adapted to provide the teaching laboratory for a department of preventive medicine?

3. How and to what extent can a department of preventive medicine help to improve the quality of community health activities and the practice of preventive medicine in the community?

4. What newer bodies of knowledge and skills are needed by a department of preventive medicine to carry out its functions of teaching, research and service in community health activities?

Committee V—Research

Chairman: David D. Rutstein
Planning committee liaison member:
Thomas A. LaSaine
Members:

John W. Brown	Felix E. Moore
Donald T. Fraser	Charles H. Rammelkamp
T. Duckett Jones	Lyle Saunders
Alexander D. Langmuir	Hugh H. Smith
William E. Lester Jr.	

Charge to Committee—It is self-evident that all departments represented in a medical school should contribute to the advancement of knowledge by research and teaching. Specifically, the purpose of this committee is to define, in broad terms, the role of research in departments of preventive medicine, as follows:

1. To outline and illustrate the research disciplines which might be represented in a department of preventive medicine.

2. To define those areas of research in which departments of preventive medicine should be expected to make significant contributions.

3. To define and illustrate the research contributions which departments of preventive medicine can make in collaboration with other departments and agencies.

Distribution of Preconference Committee Reports

The materials prepared by these committees, representing a great deal of thoughtful effort, were sent to all conference participants approximately four weeks prior to the Colorado Springs meeting. All members were asked to read three statements designed to provide a common denominator for the conference and to serve as groundwork for the more particular discussions to be held within each working committee. The first of these statements gave a general orientation to the purposes and plan of the conference itself. The other two were, respectively, a draft of the Objectives of Medical Education,* and the Objectives of Teaching in Preventive Medicine. In addition, each member was asked to study the documented agenda of the particular committee to which he was assigned.

Included also were the background materials of the other four committees. The required reading ranged from 20 to 40 pages of mimeographed material, and the entire volume was approximately 100 pages.

Membership of the Conference

The conference was made up of teachers of preventive medicine, deans of medical schools and other groups as follows:

Medical Education		105
Preventive Medicine Teaching:		
Full-Time	55	
Part-Time*	15	
Other Departments:		
Medicine	6	
Pediatrics	2	
Microbiology	1	
Psychiatry	1	
Obstetrics	1	
Surgery	1	
History of Medicine	1	
Administration	22	
Public Health		10
Teaching (Schools of Public Health)	7	
Administration**	3	
Related Fields		25
Nursing	1	
Social Work	1	
Social Sciences	3	
Audiovisual Aids	1	
World Health Organization	2	
Voluntary Health Agencies	5	
Medical Care	3	
Foundations	9	
Total		140

* Other activities include:

Public Health Administration	12
Teaching in Dept. of Medicine	1
Dean	1

**Twelve additional public health administrators listed above under Preventive Medicine Teaching, Part-Time.

* See Chapter I, pp. 8-10.

Unfortunately, limitation on the size of the conference made it necessary to exclude many persons who would also have been valuable members of the group.

Conference Committees

Prior to coming to the meeting, members expressed their preferences for committee assignments. Most were given their first or second choice. The discussion groups were set up to be comparable in size, and were balanced as to professors of preventive medicine, deans and other categories of participants. Preparatory committee members were reassigned in order to carry the thinking of all preparatory committees to the other four committees at Colorado Springs. Such an arrangement also prevented the original committees from being protective of their reports.

Membership of the committees of the conference was as follows:

Committee I—Curriculum Content and Methodology

Chairman—E. Gurney Clark
Recorder—Robert E. Shank
Planning committee liaison members—John P. Hubbard, Hugh R. Leavell

Members

Donald G. Anderson
Leon Banov
Lennox G. Bell
Paul Cleveau
W. Palmer Dearing
Lester J. Evans
Thomas E. Eyres
Thomas D. Fitzgerald
Edward Grzegorzewski
Paul Harper
William N. Hubbard
E. R. Krumbiegel
William Malamud
James M. Mather
Manson Meads
Dwight O'Hara
Leland W. Parr
William Harvey Perkins
Leland E. Powers
Jonathan E. Rhoads
Julius B. Richmond
Lyle Saunders
R. L. Simmons
R. R. Struthers
R. Percy Vivian

Committee II—Interdepartmental Relationships

Chairman—Glen R. Leymaster
Recorder—J. Wendell MacLeod
Planning committee liaison member—John H. Dingle

Members

George N. Aagaard
George A. Bennett
M. Olwen Davies
George A. Denison
Stanley E. Dorst
Marion Fay
Donald T. Fraser
Clement B. Grebel
G. Edgar Hobbs
Leonard F. Jourdonais
Mathew R. Kinde
Otto Tod Mallery Jr.
Henry E. Meleney
Mario Mollari
Herbert R. Morgan
Carl A. Nau
Elton Newman
Charles Henry Okey
John R. Paul
John J. Phair
William P. Shepard
Hugh H. Smith
Waldo L. Treuting
Myron E. Wegman
William R. Willard

Committee III—Comprehensive Health Care

Chairman—C. Howe Eller
Recorders—John W. Brown, William L. Fleming
Planning committee liaison member—Ray E. Trussell

Members

Leona Baumgartner
Paul B. Cornely
Quentin B. Deming
Alfred L. Frechette
John B. Grant
Adelard Groulx
Jerome S. Harris
Salvatore P. Lucia
Henry B. Makover
Kinlock Nelson
Stanley W. Olson
Harold E. Pearson
Robert W. Quinn
Sophie Rabinoff
Duncan E. Reid
Leonard S. Rosenfeld
Richard H. Shryock
Leo W. Simmons
Wilson G. Smillie
C. B. Stewart
Elias Strauss
Eldred V. Thiehoff
Myron M. Weaver

Committee IV—Community Health Activities

Chairman: Thomas D. Dublin
Recorders: J. Garth Johnson, Gertrud Weiss
Planning committee liaison member: Duncan W. Clark

Members

Guillermo Arbona
Alfred S. Bogucki
Joseph L. Johnson
Paul A. Lembcke
McLeod H. Riggins
David S. Ruhe

John M. Chapman
Archibald S. Dean
Mark R. Everett
L. S. Goerke
E. M. Holmes Jr.
Samuel H. Hopper
Clayton G. Loosli
Thomas McC. Mabon
Henry Packer
William N. Parkinson
Edward A. Piaszek
Mary L. Poole
Howard J. Shaughnessy
Stewart C. Thomson
John B. Truslow
Hart E. Van Riper
John B. Youmans

Committee V—Research

Chairman: David D. Rutstein
Recorders: George St. J. Perrott, Phyllis M. Walsh
Planning committee liaison member: Thomas A. LaSaine

Members

Rodney R. Beard
Gordon Blackwell
Katharine Boucot
John Z. Bowers
Thomas J. Brooks
Antonio Ciocco
T. Timothy Crocker
Jean A. Curran
Ward Darley
Thomas Francis Jr.
Harold S. Ginsberg
Alan Gregg
Joseph C. Hinsey
Carl E. Hopkins
Philip Hugh-Jones
Varner J. Johns Jr.
T. Duckett Jones
John B. Lagen
Mark H. Lepper
Thomas William Lester
Mildred C. Scoville
Cecil G. Sheps
Franklin H. Top
Ralph E. Wheeler
John M. Wyllie

Conduct of the Conference

The conference convened on Monday morning, November 3. Plans for the meeting were outlined briefly by the chairman. The 140 members then went to their respective committees, where until Wednesday noon they discussed the ideas that were to appear in the committee reports.

Each committee was encouraged to operate in any manner it thought best. Some followed their original agenda, others made modifications. There was no shifting of delegates, except for temporary assignments to other groups on committee request. No formal meetings were scheduled on Wednesday afternoon, to allow the chairmen, recorders and others concerned to concentrate on drafting their reports. On Thursday morning the groups again met to review, modify and accept the report of their committee before it was presented to the conference.

A well-organized hard-working business office, assisted by a number of volunteers, made it possible to duplicate and distribute the reports of the five committees to all members by the following morning.

On Thursday afternoon and on Friday morning the conference met in plenary session to discuss these reports. The full conference was not expected to give formal approval to committee reports, since the major purpose of the meeting was to provide an opportunity for an interchange of ideas and an expression of group opinion.

At the closing session on Friday afternoon, Dr. Richard H. Shryock, Dr. Duncan W. Clark and Dr. John P. Hubbard summarized the conference in terms of the four general questions mentioned in this report:

1. What concepts and areas of interest from the field of preventive medicine should be common to all physicians?

2. What knowledge, skills, methods and techniques should all physicians be competent to apply in order to be effective in the field of preventive medicine?

3. How can these things be taught?

4. How, and to what extent, can the medical school help to improve the quality of community health activities?

The entire conference was characterized by a spirit of informality. The work schedule was six hours daily, but discussions continued throughout all of the waking hours as members got together in the dining room, lounges or their rooms.

Integration with Association of American Medical Colleges Meeting

Preventive medicine was the topic of discussion for approximately one-half of the two and one-half day 63rd Annual Meeting of the Association of American Medical Colleges which immediately followed our conference. Discussion groups were set up by the Association to review the accomplishments in the five conference areas. Summaries of these discussions were reported to the group as a whole.

One of the major addresses of the Association meeting was the paper, "The Teaching of Preventive Medicine," presented by Dr. David P. Barr.*

Conference committee reports were made available to the deans.

Integration was achieved not only through the active participation of a number of deans in the conference but by the participation of professors of preventive medicine in the meetings of the Association.

* See reference No. 1, p. 26.

Appendix B

Conference Roster*

Aagaard, George N., M.D. (II)†
Dean, Southwestern Medical School
University of Texas

Anderson, Donald G., M.D. (I)
Secretary, Council on Medical Education and Hospitals
American Medical Association

Arbona, Guillermo, M.D. (IV)
Professor of Preventive Medicine and Public Health
University of Puerto Rico Medical School

Bakst, Henry J., M.D.
Professor of Preventive Medicine
Boston University School of Medicine

Banov, Leon, M.D. (I)
Professor of Preventive Medicine and Public Health
Medical College of South Carolina

Baumgartner, Leona, M.D., Ph.D. (III)
Assistant Commissioner
New York City Department of Health
Associate Professor of Public Health and Preventive Medicine, and Assistant Professor of Pediatrics
Cornell University Medical College

Beard, Rodney R., M.D., M.P.H. (V)
Professor of Public Health and Preventive Medicine
Stanford University School of Medicine

Bell, Lennox G., M.D. (I)
Dean, University of Manitoba Faculty of Medicine

Bennett, George A., M.D. (II)
Dean, Jefferson Medical College of Philadelphia

Berry, George Packer, M.D. (unassigned)
Dean, Harvard Medical School
President, Association of American Medical Colleges

Blackwell, Gordon W. (V)
Director, Institute for Research in Social Science
University of North Carolina

Bogucki, Alfred S., M.D., M.P.H. (IV)
Assistant Professor of Public Health and Preventive Medicine
Hahnemann Medical College

Boucot, Katharine, M.D. (V)
Professor of Preventive Medicine
Woman's Medical College of Pennsylvania

Bowers, John Z., M.D. (V)
Dean, University of Utah
College of Medicine

Brooks, Thomas J., Jr., Ph.D., M.D. (V)
Chairman, Department of Preventive Medicine and Public Health
University of Mississippi
School of Medicine

Brown, John W., M.D. (Recorder-III)
Professor of Preventive Medicine
Director, Department of Student Health
University Hospitals
University of Wisconsin Medical School

Chant, Harry L., M.D.
Assistant Director
The Johns Hopkins Hospital

Chapman, John M., M.D., M.P.H. (IV)
Instructor, Preventive Medicine and Public Health
College of Medical Evangelists
School of Medicine

Ciocco, Antonio (V)
Head, Department of Biostatistics
Graduate School of Public Health
University of Pittsburgh

Clark, Duncan W., M.D. (Liaison-IV)
Professor of Environmental Medicine and Community Health
State University of New York
College of Medicine at New York City

Clark, E. Guerney, M.D., Dr. P. H. (Chairman-I)
Professor of Epidemiology
Columbia University
School of Public Health

Claveau, Paul, M.D. (I)
Professor of General Hygiene
Faculty of Medicine, Laval University
Director of County Health Units
Province of Quebec

Cornely, Paul B., M.D. (III)
Professor of Preventive Medicine and Public Health
Howard University College of Medicine

Crocker, T. Timothy, M.D. (V)
Assistant Professor of Medicine and Preventive Medicine
University of California
School of Medicine

Curran, Jean A., M.D. (V)
Dean, State University of New York
College of Medicine at New York City

Darley, Ward, M.D. (Co-Chairman for A.A.M.C.)
Director, University of Colorado Medical Center

Davies, M. Olwen (II)
Consultant on Public Health Nursing Education
National League for Nursing

Dean, Archibald S., M.D., Dr. P.H. (IV)
Associate Professor and Acting Head
Department of Preventive Medicine and Public Health
University of Buffalo School of Medicine

Dearing, W. Palmer, M.D. (I)
Deputy Surgeon General
U. S. Public Health Service

Deming, Quentin B., M.D. (III)
Assistant Professor of Medicine
Stanford University School of Medicine

Denison, George A., M.D. (II)
Professor and Chairman
Department of Preventive Medicine and Public Health
Medical College of Alabama

Dingle, John H., M.D. (Liaison-II)
Professor and Director of Department of Preventive Medicine

* Includes participants in preconference committees, some of whom did not attend the conference itself.
† Committee affiliation.

Western Reserve University
School of Medicine

Dixon, James P., M.D.
Health Commissioner for City of Philadelphia

Dorst, Stanley E., M.D. (II)
Dean, University of Cincinnati
College of Medicine

Dublin, Thomas D., M.D. (Chairman-IV)
Executive Director
National Health Council

Eller, C. Howe, M.D., Dr. P.H. (Chairman-III)
Professor of Community Health
University of Louisville
School of Medicine

Evans, Lester J., M.D. (I)
Executive Associate
The Commonwealth Fund

Everett, Mark R., Ph.D. (IV)
Dean and Superintendent
University of Oklahoma School of Medicine

Eyres, Thomas E., M.D., M.P.H. (I)
Professor of Public Health
University of South Dakota
School of Medicine

Fay, Marion, Ph.D. (II)
Dean, Woman's Medical College of Pennsylvania

Fitzgerald, Thomas D., M.D., M.S.P.H. (I)
Assistant Dean and Director
Department of Preventive Medicine and Public Health
Creighton School of Medicine

Fleming, William L., M.D. (Recorder-III)
Professor and Chairman
Department of Preventive Medicine
University of North Carolina
School of Medicine

Florio, Lloyd, M.D., Dr. P.H. (Conference chairman)
Professor of Preventive Medicine and Public Health
University of Colorado
School of Medicine

Francis, Thomas, Jr., M.D.
Professor of Epidemiology
School of Public Health
University of Michigan

Fraser, Donald T., M.D. (II)
Professor of Hygiene and Preventive Medicine
Faculty of Medicine
University of Toronto

Frechette, Alfred L., M.D. (III)
Director, Health Division
United Community Services of Metropolitan Boston

Frye, William W., M.D., Ph.D.
Dean and Professor of Tropical Medicine and Public Health
Louisiana State University College of Medicine

Ginsberg, Harold S., M.D. (V)
Associate Professor of Preventive Medicine
Assistant Professor of Medicine
Western Reserve University School of Medicine

Goerke, L. S., M.D. (IV)
Associate Clinical Professor
Department of Medicine
University of California
School of Medicine

Grant, John B., M.D. (III)
Associate Director
Division of Medicine and Public Health
The Rockefeller Foundation

Grubel, Clement B., M.D. (II)
Assistant Dean
St. Louis University
School of Medicine

Gregg, Alan, M.D. (V)
Vice President
The Rockefeller Foundation

Groulx, Adélard, M.D., M.P.H. (III)
University of Montreal
Faculty of Medicine
Director, Montreal Health Department

Grzegorzewski, Edward, M.D. (I)
Director, Division of Education and Training Services
World Health Organization

Ham, T. Hale, M.D.
Western Reserve University
School of Medicine

Harper, Paul, M.D.
Professor of Public Health Administration
Maternal and Child Health Division
Johns Hopkins University School of Hygiene and Public Health

Harris, Jerome S., M.D. (III)
Professor of Pediatrics
Duke University School of Medicine

Hinsey, Joseph C., Ph.D. (V)
Dean
Cornell University Medical College

Hobbs, G. Edgar, M.D. (II)
Professor of Clinical Preventive Medicine
University of Western Ontario
Faculty of Medicine

Holmes, E. M., Jr. M.D. (IV)
Professor of Community Medicine
Medical College of Virginia

Hopkins, Carl E., Ph.D. (V)
Associate Professor of Public Health and Preventive Medicine
University of Oregon Medical School

Hopper, Samuel H., Ph.D. (IV)
Associate Professor of Public Health
Indiana University Medical Center

Hubbard, John P., M.D. (Liaison-I)
Professor of Public Health and Preventive Medicine
University of Pennsylvania
School of Medicine

Hubbard, William N., Jr., M.D. (I)
Assistant Dean
New York University College of Medicine

Hugh-Jones, Philip, M.D., M.R.C.P. (V)
Senior Lecturer in Medicine
University College of West Indies
Department of Medicine

Johns, Varner J., Jr., M.D. (V)
Associate Dean
College of Medical Evangelists
School of Medicine

Johnson, J. Garth, Ph.D. (Recorder-IV)
Associate Professor of Preventive Medicine and Public Health
Albany Medical College

Johnson, Joseph L., M.D. (IV)
Dean, Howard University
College of Medicine

Jones, T. Duckett, M.D. (V)
Medical Director
The Helen Hay Whitney Foundation

Jourdonais, Leonard F., M.D. (II)
Assistant Professor of Medicine
Northwestern University Medical School

Kinde, Matthew R., M.D. (II)
Director
Division of Medicine and Public Health
W. K. Kellogg Foundation

Krumbiegel, E. R., M.D. (I)
Professor and Head
Department of Public Health
Marquette University School of Medicine

Lagen, John B., M.D. (V)
Associate Dean
University of California
School of Medicine

Langmuir, Alexander D., M.D.
Chief, Epidemiology Branch
Communicable Disease Center
U. S. Public Health Service

LaSalne, Thomas A., M.D. (Liaison-V)
Chairman
Department of Preventive Medicine
Meharry Medical College

Leavell, Hugh R., M.D. (Liaison-I)
Professor of Public Health Practice
Harvard University
School of Public Health

Lembcke, Paul A., M.D., M.P.H. (IV)
Associate Professor of Public Health Administration
Division of Hospital Administration
Johns Hopkins University
School of Hygiene and Public Health

Lepper, Mark H., M.D. (V)
Associate Professor of Medicine in charge of Preventive Medicine
University of Illinois
College of Medicine

Lester, William, Jr., M.D. (V)
Associate Professor of Medicine
University of Chicago School of Medicine

Leymaster, Glen R., M.D., M.P.H. (Chairman-II)
Professor of Public Health and Preventive Medicine
University of Utah College of Medicine

Long, Lillian D., Ph.D. (unassigned)
Director, Professional Examination Service
American Public Health Association

Loosli, Clayton G., M.D. (IV)
Professor of Preventive Medicine
University of Chicago School of Medicine

Lucia, Salvatore P., M.D., Sc.D. (III)
Professor of Medicine
Chairman, Department of Preventive Medicine
University of California School of Medicine

Mahon, Thomas McC., B.C., M.D. (IV)
Professor of Hygiene and Preventive Medicine
University of Pittsburgh
School of Medicine

MacLeod, J. Wendell, M.D. (Recorder-II)
Dean, University of Saskatchewan
College of Medicine

Makover, Henry B., M.D. (III)
Organizer of Department of Preventive Medicine
Medical School of Yeshiva University

Malamud, William, M.D. (I)
Professor of Psychiatry
Boston University School of Medicine

Mallery, Otto Tod, Jr., M.D. (II)
Director, Institute of Industrial Health
Associate Professor Internal Medicine
University of Michigan

Mather, James M., M.D. (I)
Professor and Head of Department of Public Health
University of British Columbia
Faculty of Medicine

Meads, Manson, M.D. (I)
Associate Professor and Director
Department of Preventive Medicine
Bowman Gray School of Medicine of Wake Forest College

Meleney, Henry E., M.D. (II)
Professor of Preventive Medicine
New York University College of Medicine

Mollari, Mario, M.D. (II)
Professor and Director
Department of Bacteriology
Preventive Medicine and Public Health
Georgetown University School of Medicine

Moore, Felix
Chief, Biometrics Research Section
National Heart Institute
National Institutes of Health
U. S. Public Health Service

Morgan, Herbert R., M.D. (II)
Professor of Bacteriology and Chairman of the Department of Bacteriology and Preventive Medicine, and Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry

Nau, Carl A., M.D. (II)
Professor of Preventive Medicine and Public Health
University of Texas Medical Branch

Nelson, Kinloch, M.D. (III)
Director, Home Care Program
Medical College of Virginia

Nelson, Russell A., M.D.
Director
Johns Hopkins Hospital

Newman, Elton, M.D. (II)
Assistant Professor of Preventive Medicine
University of Nebraska
College of Medicine

O'Hara, Dwight, M.D. (I)
Dean, Professor of Preventive and Industrial Medicine
Tufts College Medical School

Okey, Charles Henry, Ph.D. (II)
Temporary Chairman
Division of Preventive Medicine and Public Health
University of Vermont
College of Medicine

Olson, Stanley W., M.D. (III)
Dean, University of Illinois
College of Medicine

Packer, Henry, M.D. (IV)
Professor of Preventive Medicine
University of Tennessee School of Medicine

Parkinson, William N., M.D. (IV)
Dean
Temple University School of Medicine

Parr, Leland W., Ph.D. (I)
Professor and Head of Department of Bacteriology, Hygiene and Preventive Medicine
George Washington University
School of Medicine

Paul, John R., M.D. (II)
Professor of Preventive Medicine
Yale University School of Medicine

Pearson, Harold E., M.D. (III)
Professor of Public Health
University of Southern California
School of Medicine

Perkins, William Harvey, M.D. (I)
Professor of Preventive Medicine
Jefferson Medical College of Philadelphia

Perrott, G. St. J. (Recorder-V)
Chief, Division of Public Health Methods
U. S. Public Health Service

Phair, John J., M.D., Dr. P. H. (II)
Professor of Preventive Medicine
University of Cincinnati
College of Medicine

Piszczek, Edward A., M.D., M.P.H. (IV)
Chairman, Department of Preventive Medicine and Public Health
Stritch School of Medicine of Loyola University

Poole, Mary L. (IV)
Director Social Service Department
Hospital of the University of Pennsylvania
Associate Professor of Social Work
Department of Preventive Medicine
School of Medicine

Powers, Leland E., M.D. (I)
Professor and Head of Department of Public Health and Preventive Medicine
University of Washington
School of Medicine

Quinn, Robert W., M.D. (III)
Professor and Head of Department of Preventive Medicine and Public Health
Vanderbilt University School of Medicine

Rabinoff, Sophie, M.D. (III)
Professor of Public Health and Preventive Medicine and Director of Department
New York Medical College

Rahm, Evelyn, M.S.P.H. (Conference Secretary)
Health Education Consultant
U. S. Public Health Service

Rammelkamp, Charles H., M.D.
Associate Professor of Preventive Medicine
Western Reserve University
School of Medicine

Reid, Duncan E., M.D., (II)
Professor of Obstetrics
Harvard Medical School

Rhoads, Jonathan E., M.D. (I)
Professor of Surgery
University of Pennsylvania
School of Medicine

Richmond, Julius B., M.D. (I)
Professor of Pediatrics
University of Illinois
College of Medicine
Director, Institute for Juvenile Research
Chicago, Illinois

Riggins, McLeod H., M.D. (IV)
Chairman
American Trudeau Society
Medical Section, National
Tuberculosis Association

Romano, John, M.D.
Professor of Psychiatry
University of Rochester School of Medicine and Dentistry

Rosen, George, M.D.
Professor of Health Education
Columbia University
School of Public Health

Rosenfeld, Leonard S., M.D. (III)
Chief, Health Professions
Education Branch
Division of Public Health Methods
U. S. Public Health Service

Ruhe, David S., M.D. (IV)
Director, Medical Audio-Visual Institute
Association of American Medical Colleges

Rutstein, David, D., M.D. (Chairman-V)
Professor and Head of Dept. of Preventive Medicine
Harvard Medical School

Saslow, George, M.D.
Department of Neuropsychiatry
Washington University
School of Medicine

Saunders, Lyle (I)
Associate Professor of Preventive Medicine and Public Health (Sociology)
University of Colorado School of Medicine

Scoville, Mildred C. (V)
Executive Associate
The Commonwealth Fund

Shank, Robert E., M.D. (Recorder-I)
Professor of Preventive Medicine and Public Health and Head of the Department
Washington University School of Medicine

Shaughnessy, Howard J., M.D. (IV)
Professor and Head of
Department of Public Health
University of Illinois College of Medicine

Shepard, William P., M.D. (II)
Third Vice President
Health and Welfare
Metropolitan Life Insurance Company

Sheps, Cecil G., M.D., M.P.H. (V)
Director of Program Planning
Division of Health Affairs
University of North Carolina

Shryock, Richard H. (III)
Director, Institute of the History of Medicine
Johns Hopkins University

Simmons, Leo W. (III)
Professor of Sociology
Yale University
Social Anthropologist
Russell Sage Foundation

Simmons, R. L., M.D. (I)
Professor of Public Health and Preventive Medicine
Louisiana State University
School of Medicine

Smillie, Wilson G., M.D., Dr. P.H. (III)
Professor of Public Health and Preventive Medicine
Cornell University Medical College

Smith, Hugh H., M.D. (II)
Associate Director
Division of Medicine and Public Health
The Rockefeller Foundation

Stalnaker, John M. (unassigned)
Director of Studies
Association of American Medical Colleges

Stewart, C. B., M.D., M.P.H. (III)
Professor of Epidemiology
Department of Preventive Medicine
Dalhousie University
Faculty of Medicine

Strauss, Elias, M.D. (III)
Clinical Professor of Preventive Medicine
Southwestern Medical School of the University of Texas

Struthers, R. R., M.D. (I)
Associate Director

Division of Medicine and Public Health
The Rockefeller Foundation

Thiehoff, Eldred V., M.D., M.P.H. (III)
Professor of Public Health and Preventive Medicine
University of Kansas School of Medicine

Thomson, Stewart C., M.D. (IV)
Associate Professor and Assistant Director
School of Public Health
University of Minnesota Medical School

Top, Franklin H., M.D. (V)
Professor of Hygiene and Preventive Medicine
State University of Iowa
College of Medicine

Treuting, Waldo L., M.D. (II)
Professor of Public Health Administration
Tulane University of Louisiana
School of Medicine

Truslow, John B., M.D. (IV)
Dean
Medical College of Virginia

Trussell, Ray E., M.D., M.P.H. (Liaison-III)
Director, Hunterdon Medical Center
Clinical Professor of Preventive Medicine
New York University College of Medicine

Van Riper, Hart E., M.D. (IV)
Medical Director
National Foundation for Infantile Paralysis

Vivian, R. Percy, M.D. (I)
Strathcona Professor and Chairman of the Department of Health and Social Medicine
McGill University Faculty of Medicine

Voyer, R. F. (unassigned)
General Director
The David Graham Hall Foundation

Weaver, Myron M., M.D. (III)
Dean, University of British Columbia
Faculty of Medicine

Wegman, Myron E., M.D. (II)
Chief, Division of Education and Training
Pan-American Sanitary Bureau
World Health Organization

Weinzirl, Adolph, M.D., M.P.H.
Professor of Public Health and Preventive Medicine
University of Oregon Medical School

Weiss, Gertrud, M.D., M.S.P.H. (Recorder-IV)
Assistant Professor of Preventive Medicine and Public Health
University of Colorado School of Medicine

Wheeler, Ralph E., M.D. (V)
Professor of Bacteriology
Professor of Preventive Medicine
Tufts College Medical School

Willard, William R., M.D. (II)
Dean, Professor of Public Health
State University of New York College of Medicine at Syracuse

Wyllie, John, M.D. (V)
Professor of Public Health and
Preventive Medicine
Queen's University Faculty of Medicine

Youmans, John B., M.D. (IV)
Dean, Vanderbilt University
School of Medicine

Appendix C

Current Research in Preventive Medicine

In order to obtain information on the current range of research interests in departments of preventive medicine, a letter was sent to deans of 92 medical schools in Canada and the United States, requesting a list of the titles of research studies in preventive medicine published or accepted for publication from their medical schools since January 1, 1950.

As of September 9, 1952, replies had been received from 70 medical schools and have been analyzed in categories according to an arbitrary list of "fields" in which the research projects were conducted.* No attempt was made to measure the quantity or quality of the research publications or to evaluate the total research program of any department. The tabulation is limited to research papers; i.e., those in which data were collected and analyzed and which were published primarily under the auspices of a department of preventive medicine. Excluded from the analysis are descriptive papers and those primarily published under the auspices of a unit not concerned with undergraduate medical teaching (e.g., a local health department). Analysis has been arbitrary where departments of preventive medicine are operated jointly with other departments. Replies were also received from three universities (Columbia, Michigan and Minnesota) where schools of public health are responsible for undergraduate teaching in preventive medicine. Because of differences in method of reporting among these schools, they are not included in the analysis.

The majority of research programs are in epidemiology (17 departments) and in the field of infectious diseases, either in bacteriology (12), immunology (14) and/or virology (13). A significant number (11) of preventive medicine departments, particularly those concerned with the teaching of tropical disease, are engaged in research programs in parasitology, entomology or mycology. A surprising finding was the large number (15) conducting therapeutic trials of drugs either in animals or in man.

Other areas of research activity, in the order of numbers of departments engaged in each, are as follows: biochemistry (8), administrative research (6), case finding (6), medical care (4), environmental sanitation (4), natural history of disease (3), physiology (3), industrial medicine (2), toxicology (2), statistics and vital statistics (2) and a group of miscellaneous studies being performed by 8 departments.*

* This analysis was prepared as background information for the Committee on Research and all members of the conference. The categories were arbitrarily established by the analyst after a survey of the material submitted.

* Miscellaneous studies were in hematology; crash injuries; cytohistology; tissue culture; rheumatic heart disease in pregnancy; growth and development; schizophrenia; roentgen manifestations of acute intermittent porphyria; and student health.

Appendix D

Investigative Possibilities for a Disease of Multiple Causation: Outline for Rheumatic Fever

IN THE ATTACHED chart, the research possibilities of control of rheumatic fever are briefly suggested, to illustrate some of the research approaches appropriate to a department of preventive medicine.

I. Etiology of the disease is subdivided to indicate multiple etiologic factors, including the host as a species, interactions between the host and a series of other ecologic factors, as housing, crowding, climate and geography. The research disciplines useful to the study of these multiple etiologic factors are briefly indicated.

It is evident that many fields may contribute to the definition of etiology; that a department of preventive medicine can supply certain important disciplines; and that the broad orientation of preventive medicine should facilitate collaboration with professional fields not commonly represented in medical schools but potentially valuable to the definition of etiology. Obviously, the power to prevent disease is increased by the understanding of causation.

II. Identification of cumulative events leading to recognizable disease is posed as a problem common to understanding of diseases in which there seem to be multiple etiologic factors in causation. While many of the scientific disciplines listed in this chart should contribute to the solution of this problem, a department of preventive medicine (1) should cooperate with departments in which these disciplines exist; (2) could undertake studies of and experimental services to family groups, in identifying the cumulative interactions of causal factors with a view to earlier prediction, prevention or detection of disease.

Research leading to improved methods of detection of rheumatic fever may now be in progress, but few preventive functions can be assumed to operate today at the desirable level. Controlled family studies, possibly using existing family care programs as a means of reaching the population, would be useful in (1) improving prediction or detection of disease, in (2) testing the value of preventive measures, and in (3) testing hypotheses of etiology by application of controlled preventive techniques specific for single etiologic factors.

However, confusion between research and service aspects of such family care programs is disastrous to research. An important requirement of research is control of any procedure or use of therapeutic agents by balanced withholding of these from comparable individuals. If groups oriented toward delivery of service are not cognizant of this need or unable, e.g., for ethical reasons, to be compliant to this requirement, they are seriously hampered as to research function. Likewise, service-oriented community agencies may not be useful research collaborators of a department of preventive medicine. Furthermore, a service program initiated by a department of preventive medicine is unlikely to contribute to development of rational prevention if it lacks this fundamental research orientation, and should not then be considered a proper contribution of the medical school to the community.

III. Course of the disease after recognition is briefly outlined and is most familiar to present students of the disease. The numerous research approaches designed to describe and measure alterations in bodily structure and function will doubtless be extended. The agencies pertinent to care, rehabilitation and prevention of sequellae and progression will also be extended. So far as departments of a medical school are concerned, including the departments of preventive medicine, the cautions emphasized under *II*, above, are reiterated in connection with the introduction of preventive, therapeutic, reconstructive and other measures.

IV. Study of effects of preventive and therapeutic measures should be designed to detect and measure the unintended and possibly undesirable consequences as well as the intended and desirable. The fact that some of these consequences may be distant in time and unforeseen in location may require continuation of the studies over long periods and in considerable breadth of field.

The Nature and Effects of Control of Disease of Multiple Causation: Outline for Rheumatic Fever

Problem	*Research Approach*
I. ETIOLOGY OF THE DISEASE	
A. Host factors. B. Ecologic factors (host-environment interactions): streptococcal infections plus geography, climate, nutrition, aggregation and other social factors.	A. Histopathology, histochemistry, biochemistry, genetics, etc. B. Bacteriology, immunology, epidemiology, aided by: biostatistics, sociology, economics, anthropology, psychology.
II. IDENTIFICATION OF CUMULATIVE FACTORS LEADING TO RECOGNIZABLE DISEASE	
Relationships of host and ecological factors as they lead to recognized disease and to possibilities of prevention or modification.	Exploratory population studies: family, industry, total population. 1. Morbidity analysis (occurrence of disease in a population.) 2. Controlled experimental service programs such as family care programs, etc. 3. Bacteriologic, immunologic, therapeutic trials.
III. COURSE OF DISEASE AFTER RECOGNITION, AS INFLUENCED BY:	
A. Diagnosis, medical management of disease. B. Rehabilitation measures. C. Measures for prevention of sequelae and complications.	A, B, & C. 1. Clinical and lab. observations including disciplines in I above. 2. Controlled therapeutic trials with measurement of therapeutic effect and side-effects of "services" applied for purpose of testing their usefulness, e.g., home nursing, convalescent home, mental hygiene education, etc. 3. Follow-up registry for longitudinal study of the disease.
IV. STUDY OF EFFECTS OF PREVENTIVE AND THERAPEUTIC MEASURES, AS THEY DISTURB THE ECOLOGIC BALANCE	
A. Effects of individual and his immediate groups (family, school, institution, etc.)	A. Examples and Techniques: 1. Studies of influence of presence or removal of diseased child from family. 2. Effect of prophylactic measures applied to entire family on behalf of diseased or potentially diseased members. 3. Techniques of clinical observation, aided by biostatistics, bacteriology, psychology, sociology, etc.
B. Long-range effects on large groups (unintended consequences, or "side-effects")—community, society, etc.	B. Examples and Techniques: 1. Study of quantitative and qualitative changes and dislocations in population consequent upon therapeutic and preventive measures (change in age, sex, composition of population, altered capacity for productive effort, altered resistance to infection, etc.) 2. Techniques of demography, economics, sociology, immunology, clinical observation, biostatistics, epidemiology, of morbidity, psychology, sociology, etc.

N. B. Most of the methods and disciplines included represent those commonly available in departments of preventive medicine or with which departments of preventive medicine have occasionally collaborated.
Challenging opportunities for teaching through research experience are present in all the research approaches indicated

Appendix E

Audiovisual Aids

AUDIOVISUAL AIDS have an important place in the teaching of preventive medicine. Teachers of preventive medicine should take full advantage of sound recordings, slides, filmstrips, motion pictures and television.

Since the subject is of such broad scope, it would be desirable if the Association of American Medical Colleges Committee on Audiovisual Aids might include one or more members who are especially interested in applications of such aids to the teaching of preventive medicine.

The conference would particularly bring to their attention the following areas in which it is believed that audiovisual methods may have an especially important role:

1. Presentation of diseases infrequently encountered in the community, such as tetanus.
2. Presentation of highly contagious diseases such as smallpox and plague.
3. Presentation of the fundamental patterns of the spread of epidemics.
4. Presentation of interviewing techniques and of infant and child behavior, since they do not lend themselves to direct demonstration before large groups.
5. The drawing together of social, environmental and other factors in life histories to form coherent stories.
6. Presentation of case histories in mental hygiene; for example, the demonstration of the factors of rejection and neglect in the development of pathological emotional states.
7. Presentation of various areas in community and environmental sanitation, either as preparation for field trips or as a partial substitute for those trips which are not possible.

It is believed that eventually film libraries should be made available which students could consult individually as they do books.

It is further recommended that adequate sources of information about existing audiovisual material be made available to medical school faculties. It is important that the faculty members using such films feed back evaluations of their usefulness and teaching efficiency to members of the Association of American Medical Colleges Committee to aid in planning future productions.

Appendix F

Status of Preventive Medicine in Medical Schools: Organization, Personnel and Space (Academic Year 1951-1952)

I. ORGANIZATION

Information was collected about the present status of departments of preventive medicine in the administrative structure of medical schools. The following data are a fairly accurate representation of formal administrative structure, but considerably less accurate as representing function. It can be best evaluated when correlated with similar data regarding personnel and budget.

Kind of Administrative Structure

	Number of Schools
(a) Independent department	54
(b) Combined with another department	14
With microbiology	9
With industrial hygiene	2
With tropical medicine and parasitology	1
With student health	1
With medicine	1
(c) No medical school department	8
Function assigned to another department	2
Function of school of public health	5
No apparent assignment	1
(d) Subdepartment of medicine	7
Total schools reporting	83

II. PERSONNEL

The data derive only from those schools which have either a separate department of preventive medicine or a division or section of preventive medicine in the department of medicine. There are 61 such schools. This table is based on information provided by 46 schools out of this group who responded to a questionnaire sent to all.

(1) Full-time university faculty, regardless of other university responsibilities, with responsibility in the department of preventive medicine. (Includes (2) and (3).)

Mean	3.2 persons
Median	2
Range	0–19 (12 schools had *none*)

(2) Full-time medical school faculty with responsibilities limited to preventive medicine:

Mean	1.4 persons
Median	1
Range	0–7 (23 schools had *none*)

(3) Full-time medical school faculty with responsibilities which include but are not limited to preventive medicine:

Mean	1.5 persons
Median	1
Range	0–14 (23 schools had *none*)

(4) Part-time faculty—exact data are not available, but such persons are almost entirely unpaid by the medical school:

Mean	8.6 persons
Median	5
Range	0–34 (7 schools had *none*)

III. SPACE

Information was received from the 61 schools which have separate departments, divisions, or sections of preventive medicine, regarding allocation of space. The locations of the departments of preventive medicine are as follows:

In the teaching hospital	17
In the basic science building, if different from (1)	18
In the local health department, if different from (1) and (2)	5
Other locations	5
No information	16
Total	61

In regard to laboratory space, regardless of size and type, the schools responded as follows:

Have research laboratory space	28
No research laboratory space	18
No information	15
Total	61